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THE IRON AGE

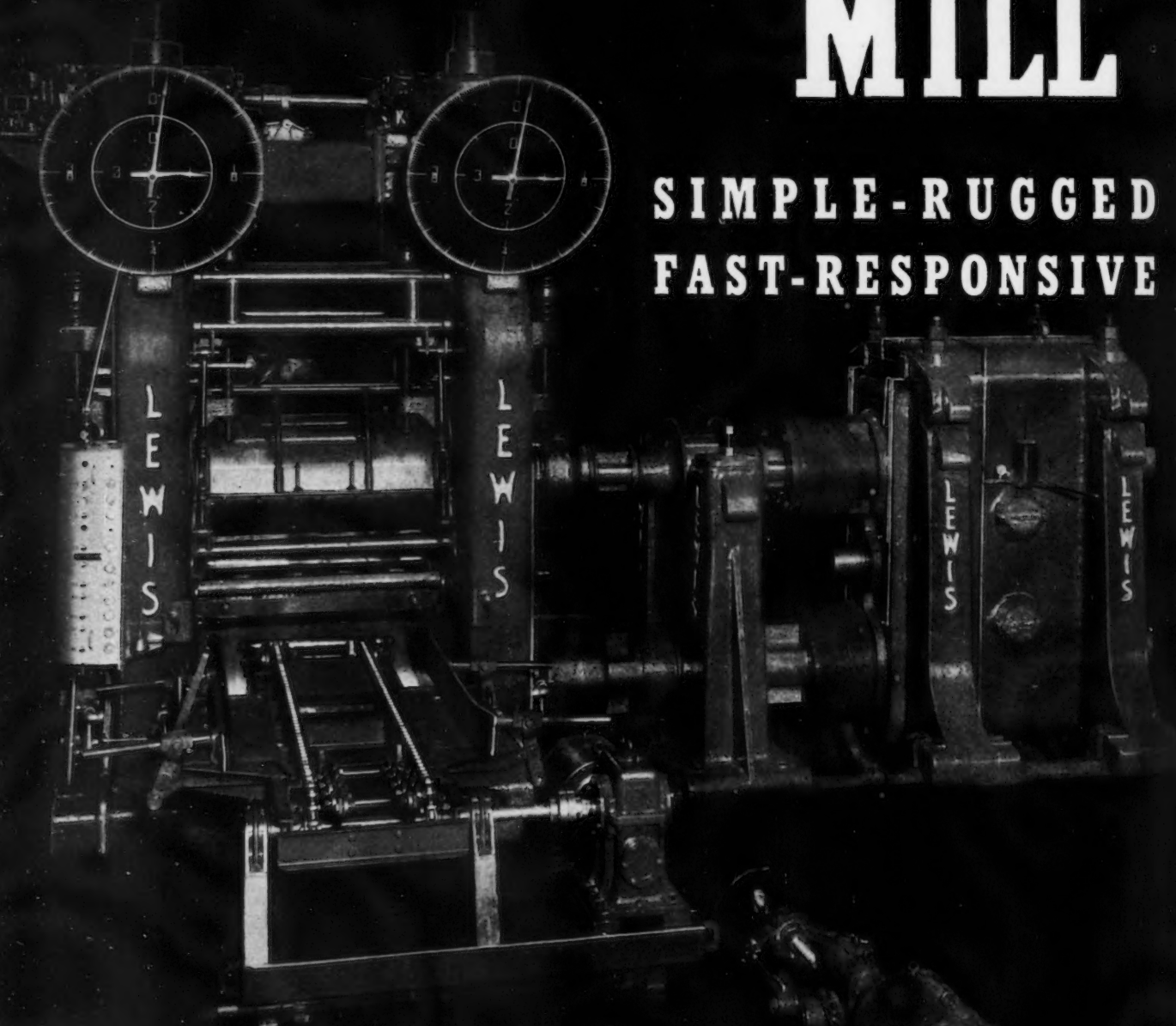
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THE IRON AGE

NOVEMBER 16, 1939

ESTABLISHED 1855

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Hands Across the Border

WE do not think of our neighbor, Canada, as being a militaristic country. Her trained fighting forces, active and reserve, on land and in the air, comprised a total of less than 54,000 men prior to the outbreak of the war. Yet, next to the British Navy, Canada is probably Great Britain's most valuable military asset.

There are two principal reasons for this. One is Canada's remoteness from Europe. The other is her proximity to the United States.

In the horse and buggy days prior to the World War of 25 years ago, nearness of the sources of supply to the front lines was a military asset. Crude transportation methods made miles count heavily. With refinement in transportation and the motorization of it, this factor has decreased in importance. And against it has developed the increasing vulnerability of munitions works and storage dumps to air attack. Even during the preceding war, a quarter century ago, vulnerability to air attack was such that munition plants were forced to shut down frequently on clear nights for fear of detection. Today, the flying range of bombers is so much greater that there is scarcely an "invulnerable" spot on the face of Europe. Canada is far enough away from Europe, but not too far. It has a racial homogeneity and spirit of loyalty comparable with that of the British Isles themselves. It is the most advanced, industrially, of all the Dominions, already having over 1200 metal-working plants and machine shops within its borders. It is a land of free enterprise and initiative, not plagued as yet by the sinister shadows of labor racketeering.

And Canada is next door to the United States, with the doors of both wide open. What Canada may lack in the way of machines or materials can be supplied by us almost overnight. That is principal asset number two.

With this compelling combination of circumstances, the course of world politics, come war or come peace, dictates the further industrialization of Canada as a primary defensive measure for the British Empire. For even with an armistice or a peace treaty or even an internal upset in Germany, we are not again likely to see, in our generation, that state of mutual trust abroad that risks a war of nerves through unpreparedness.

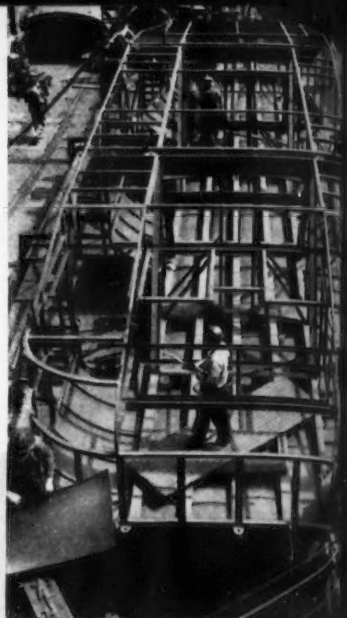
In the belief that we can well serve our many Canadian readers as well as our United States readers who are interested in this subject, The Iron Age is now embarking upon a series devoted to Canadian industry and what is happening to it. The first article in this series is based upon comprehensive personal contact with leading industrialists and statesmen of Canada, and forms the leading article in this issue. Others will appear at frequent intervals.

J. H. H. H. H.



(Left) Rear Admiral Richard E. Byrd with the American flag he dropped on his first trip to the South Pole.

(Right) The vast frame—Inland Hi-Steel sections welded together, ready for the skin of Inland Hi-Steel sheets. Rivets would have increased the weight by about 2½ tons.



(Below) The Snow Cruiser, designed and built at a cost of \$150,000 by Research Foundation of Armour Institute of Technology—55 feet long, 15 feet wide, 15 feet high.



Antarctic Snow Cruiser is Built of INLAND HI-STEEL

When Rear Admiral Byrd leads the United States claim-laying expedition to Antarctica, Inland Hi-Steel will be a vitally important member of the party.

The expedition's huge snow cruiser—combined de luxe trailer-home, armored tank and scientific laboratory—is constructed of Inland Hi-Steel: the entire frame structure, wheels, floor plates, and outside sheathing.

Inland Hi-Steel was selected as ideal for meeting every requirement of design and fabrication. It is much stronger than ordinary carbon steel—has more than 2½

times the resistance to corrosion. But above all, it has extraordinary ability to withstand repeated high impact shocks at extremely low temperatures.

Here indeed is dramatic evidence of Inland Hi-Steel's ideal applicability, wherever high strength and light weight are necessary. It requires no special equipment or processes for fabricating—welds easily by any method, is readily punched, sheared, machined, or formed. It costs little more than ordinary steel. The Inland Hi-Steel Bulletin will be sent on request.

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Canada's Part *in the* WAR

By C. E. WRIGHT

Managing Editor, *The Iron Age*

(The following article is based on interviews with Canadian Government officials at Ottawa and with bankers, steel executives and other industrialists in Montreal and Toronto.)

THE extent of Canada's industrial and military participation in the European war has not up to the present been fully determined and will be partly governed by the developments of the war itself.

The American visitor finds little outward evidence that Canada is a nation at war except for the common sight of men in uniform. Yet underneath the surface there is a quiet, grim determination to see the thing through come what may.

Canada's war preparations are progressing slowly, except perhaps in the field of aviation, a fact which has brought criticism from the opposition party in Parliament. Prime Minister Mackenzie King told the nation in a recent radio broadcast that Canada's contribution to the war, which will be no "unplanned and irresponsible campaign," may be the deciding factor in

the final result. "Our contribution to economic warfare," he said, "may easily prove to be the most important of all."

Investigation in Canada shows that what has seemed to be the slow development of war plans is due to one or more of the following factors:

1. The difficulty experienced in a democracy in turning almost overnight from a peace-time to a war-time economy and the determination of the Canadian Government that this transition shall be accomplished with the least possible disturbance to the future well-being of the nation.

2. The character of the war itself, which is giving the Allied governments time for more careful consideration of every move than was possible in the World War.

3. The fact that Great Britain herself is much better prepared industrially at this stage of the present war than she was after two years of the war of 1914-1918.

4. The foreign exchange situation, which makes it necessary for both Great Britain and Canada to guard their expenditures carefully in order to get the most for their money and to maintain

the financial position required for purchases abroad, particularly in the United States under its "cash and carry" plan.

5. The time that has been taken by the Congress of the United States in revising the Neutrality Act, the outcome of which was important to Great Britain and Canada in final determination as to what war contracts should logically be placed in the United States. Had the arms embargo not been repealed, Canada's role in the war would have been different, as Canada might have had to supply war equipment which can now be much more quickly obtained in the United States, airplanes being the most conspicuous example.

Amid the uncertainty that still exists regarding Canada's part in industrial preparations for what is generally believed may be a long war—two or three years—several facts, however, stand out clearly. One is that Canada will supply Britain with as much material aid as her industrial facilities will permit. The part that the manufacturers of the United States will play in supplying Canada with materials and machines will, unless the character of the war changes greatly, be confined to overflow requirements and to those

things which the United States is already equipped to produce and for which facilities for manufacture would have to be provided in Canada.

For example, several companies in Canada are now making airplane bodies, but there is no company fully equipped with machinery and technicians to turn out airplane engines; hence the motors will be supplied by United States manufacturers. In the

In aviation Canada will recruit and train 25,000 pilots and mechanics on its own soil in cooperation with Britain, Australia and New Zealand, the expense to be borne jointly. While the work of recruiting and training is already under way, the air program will be facilitated by the repeal of the arms embargo by the United States which has enabled the Canadian air force to obtain planes from this coun-

have to go by rail to the Atlantic Coast ports of Halifax and St. John. This factor necessitated the immediate purchase of 4575 freight cars, 49 locomotives and about 82,000 tons of rails. Production of the equipment will be speeded up so that the car and locomotive shops will be free for munitions work upon completion of the railroad orders about six months hence. About 90 per cent of the steel required for the cars and locomotives has been purchased in Canada, a small part, including the wheels, from England, and the remainder, chiefly locomotive boiler and firebox steel, from a mill in the United States. The plates for the cars will be furnished by the Dominion Foundries & Steel, Ltd., of Hamilton, Ont., which has an annual plate rolling capacity of 150,000 tons.

Few War Orders Yet

Only a few Canadian plants are as yet working on what may be termed war orders, other than in the aviation field, and some of these are merely trial orders given out so that plant technicians may familiarize themselves with methods of production for the larger orders that may come later. From machine tool sources it is learned that a large number of Canadian plants are being tooled up in anticipation of war orders.

A naval and merchant shipbuilding program has been formulated, although details of contracts have not yet been announced. There are 40 shipyards of various size in Canada which in 1937 built 36 ships, did considerable repair work and also turned out aircraft, industrial machinery and other products of the value of \$2,629,377. During the World War the Canadian shipyards turned out a considerable number of small naval craft for protecting the coasts and for aid in convoying merchant ships.

As of the end of 1937, the Dominion Bureau of Statistics listed 1345 iron and steel and metal-working plants, many of which, it is presumed, could be adapted to some kind of war work. These were divided into the following classifications, with the number of plants in each group: Primary iron and steel, 55; castings and forgings, 231; heating and cooking apparatus, 68; boilers, tanks and engines, 54; farm implements, 37; machinery, 214; automobiles, 15; automobile parts, 88; bicycles, 4; aircraft, 8; shipbuilding and ship repairs, 40; railway rolling stock, 37; wire and wire goods, 75; sheet metal products, 148; hardware, cutlery and tools, 148; bridge and structural

Imports of Metal-Working Machinery By Canada During Past Three Months

		July	August	September
Drilling and boring machines.	Total all countries.....	\$46,825	\$67,437	\$92,702
	United Kingdom	19,411	1,752	4,290
	United States	27,028	65,685	88,089
Grinding machines.	Total all countries.....	35,103	47,362	23,054
	United Kingdom	11,490	9,335	166
	United States	18,370	30,409	22,381
Lathes.	Total all countries.....	85,400	59,412	62,174
	United Kingdom	20,281	19,819	3,159
	United States	64,772	39,164	57,582
Milling machines.	Total all countries.....	221,734	48,871	64,032
	United Kingdom	50,560	31,857	13,635
	United States	127,914	16,845	48,186
Planers.	Total all countries.....	.....	.....	7,868
	United Kingdom .....	.....	.....	.....
	United States .....	.....	.....	7,868
Presses.	Total all countries.....	10,839	16,421	8,389
	United Kingdom	3,621	1,494	.....
	United States	7,218	14,927	8,389
Rolling mill machines, n.o.p.	Total all countries.....	35,529	8,538	21,299
	United Kingdom .....	.....	.....	.....
	United States	7,409	7,109	21,299
Shapers and slotters.	Total all countries.....	3,953	4,073	4,155
	United Kingdom .....	.....	3,526	.....
	United States	3,953	547	4,155
Metal working machinery, n.o.p.	Total all countries.....	169,496	179,983	245,617
	United Kingdom	14,559	7,105	15,618
	United States	151,067	170,985	226,161

matter of manufacture of shells and other ammunition, it should be remembered that in 1917 Canada was supplying about 45 per cent of the shells used by Britain and that nearly 400 Canadian manufacturers were engaged in making shells and other munitions. This war has not as yet produced as large a need for expendable munitions as did the early phases of the World War.

Canada's war preparations thus far have been largely centered on aviation and the railroads in the industrial field and to the recruiting of a small army by voluntary enlistment in infantry and aviation forces. Recruits have largely come from the unemployed. One of the first purchasing jobs was to provide uniforms and accoutrements for the soldiers.

try at once. Many of these planes will be flown to Great Britain by pilots trained in Canada.

Railroad Rehabilitation Started

One of the most necessary war preparations was to rehabilitate the Canadian railroads. Like the roads in the United States, these carriers had postponed necessary improvements and additions to equipment until a more favorable time from the standpoint of earnings, but the outbreak of war created a new situation. It was no longer considered feasible to move a good deal of freight, including grain, from western Canada by boat through the Panama Canal. During the winter, when Quebec, Montreal and other ports on the St. Lawrence River are ice-bound all shipments for Europe will

steel, 19; miscellaneous iron and steel, 104.

Canada Better Prepared Today

Canadian industry is much better prepared for hostilities than it was in 1914, according to a comprehensive survey made by the Royal Bank of Canada. During the past 25 years the Canadian economic structure has been transformed from one based mainly on agriculture to one of greater diversification in which manufacturing plays a leading role, says the bank's statement, which makes the following further interesting comparison of Canada in 1914 and today:

"Today the possibility of hostilities was anticipated and plans formulated for the speedy re-orientation of Canadian industry to a war basis. In every physical way she is better prepared and equipped to supply munitions and similar materials than in 1914. The iron and steel industry, which under war-time stimulus, reached a peak of a million tons of pig iron annually, has doubled its potential output. Manufactured products of which iron and steel form the chief component material had a value of only \$113,650,000 in 1910 and \$120,425,000 in 1915. Tremendous expansion followed due to the pressing demand for munitions and the strenuous endeavors of Canadian manufacturers to meet this need; the total value of these products rose to nearly 700 million dollars in two years, reaching \$715,115,000 in 1918. The coming of peace caused a cessation of the manufacture of munitions, but with the increasing use of motor transportation and the development of automobile and allied industries in Canada, with the restoration of more normal conditions and the general expansion of business in the late twenties, operations were again active, the value of these products reaching an all-time peak of 738 million dollars in 1929. In 1937, the total was \$624,830,000; in 1938, \$550,500,000."

For some time prior to this war the National Steel Car Co., Hamilton, Ont., was working on shells. The John Inglis Co., Toronto, has just recently got into production on Bren machine guns, although the contract was awarded some time ago. A recent announcement is that the Sorel Steel Industries, Ltd., located near Montreal, has a British contract for field guns. These are the principal munitions contracts in Canada to which publicity has been given.

War Supply Board Active

However, the activity that is now going on at the offices of the War Supply Board, which temporarily are in a building at 107 Sparks Street, Ottawa, indicates that progress will be more rapid from this time on. The

newly constituted War Supply Board, of which Wallace R. Campbell, president of the Ford Motor Co. of Canada is chairman, officially took over all purchases for the Canadian Government as of Nov. 1. Orders placed in Canada by the British purchasing commission will also go through this board. Before the board had even officially begun to function it made a survey of all available plants in Canada. Each plant has been told what



Prime Minister Mackenzie King
of the Dominion of Canada

it is expected to do and the work of assigning war contracts is expected to proceed somewhat more rapidly in the near future, although every move is being carefully considered.

Anything that cannot be obtained readily in Canada probably will be contracted for in the United States, but it is clear that Canadian resources will be drawn upon to the fullest extent. One of the greatest requirements will be machine tools, demand for which from the United States has already been greatly accelerated. Canadian machine tool plants, of which there are only a few, are expanding production facilities.

To what extent Canada will find it necessary to increase purchases of steel from the United States is a matter for future determination. The Canadian mills are solidly booked for two or three months ahead, but much of this business is for non-war purposes and

can be set aside in favor of war work if necessary. After the outbreak of war Canadian mills took such orders with the proviso that war orders, when they developed, would be given priority. Canadian steel companies believe that they will be able to handle the matter of priority shipments without any official order from the Government. With war work being given voluntary priority by the Canadian mills, it is obvious that much of the steel business which comes to the United States from the Dominion will be for non-war purposes—the overflow business that Canadian mills may not be able to handle.

United States mills with sales offices in Canada are virtually out of the market on all major products for the remainder of this year, as they are in this country. This fact, however, will not seriously inconvenience Canada's war work as it is unlikely that contracting for munitions will have proceeded to the point where steel is required in large volume in less than two or three months.

No Frenzied Buying

It was made clear to this writer by official sources that there will be no frenzied war buying either by Canada or Great Britain and that each step will be carefully considered with respect to the most essential requirements, the foreign exchange situation, the availability of shipping and various other factors. No less than Great Britain, Canada is faced with an adverse money exchange in trading with the United States, and, while this will not be permitted to militate against essential purchases, it is a factor that will have to be considered. For each American dollar that it requires to settle trade balances one dollar and ten cents of Canadian money must be paid. On imports from the United States the additional costs for freight transportation and customs duties are considerable. For example, the delivered price of some steel products shipped from the United States into Canada is about \$15 a ton over the Canadian price when the costs of exchange, freight and duty are added.

There is no suggestion of Government price control in Canada for essential commodities such as steel. Canadian steel companies are averse to raising prices beyond the point that may become necessary by reason of increased costs. There are strong intimations in responsible quarters that anything savoring of war profiteering will be strongly condemned not only

by Government officials but by leading industrialists.

Yet at the same time the Government seemingly takes the position that reasonable profits will be encouraged on the ground that only through profits and a greater degree of general prosperity in Canada can the Dominion's war expenditures be financed. To a large extent Canada is committed to a "pay-as-you-go" policy in war financing. To the end that as large a share as possible of the cost of the war shall be borne during the duration of the war, taxes have been generally increased, including an excess profits tax on business, a rise in the personal income tax rate, additional customs duties on alcoholic beverages, tea, coffee, cigarettes, etc., and special excise taxes on Canadian-produced beverages and tobacco.

Canada will strive to avoid excessive borrowing and excessive credit expansion in its fiscal conduct of the war. The Minister of National Revenue, J. L. Ilsley, in presenting his fiscal program to the Dominion House of Commons said that Canada will follow as far as may be practicable a pay-as-you-go policy.

"In imposing the new tax burdens, which this policy will require, we shall be guided by the belief that all our citizens will be ready to bear some share of the cost of the war, but we shall insist on the principle of equality of sacrifice on the basis of ability to pay. We shall not of course be able to meet all war costs by taxation, because there is a limit to the taxes that can be imposed without producing inefficiency, a lack of enterprise, and serious discontent. * * * What we cannot meet by taxation we shall finance by means of borrowing from the Canadian public at rates as low as possible."

The Key to Canadian Policy

With reference to the lessons that were learned from the last war, the Minister of National Revenue said:

"No country had the courage to finance the great war solely by taxation and borrowings out of savings. * * * For the last 20 years the world has been paying the price—a colossal one. Indeed it is perhaps not too much to say that some of the roots of the present war are to be found in the worldwide unsound financing of the last war and the great economic dislocations and continuing burdens of which it was in part the cause. It is to be hoped that in the present war the world may be able to avoid a repetition of that experience."

In these quotations may be found the key to the policy which Canada is attempting to follow. Each step in purchasing and financing will be carefully considered from the standpoint of its ultimate result on the country's economy.

An example of this careful buying policy is to be found in the recent purchase from Canadian copper producers of 420,000,000 lb. of copper at a price, which though not officially announced, is said to be only slightly over 10c. a lb. There is to be an avoidance wherever possible of purchases that will unduly inflate prices. Canada's surplus lead and zinc has been similarly purchased by Britain.

First Loan \$200,000,000

Thus far the Canadian Government has resorted to public borrowing to the extent of only \$200,000,000. Part of the proceeds of this loan were used to redeem Canadian bonds held in London to the amount of about \$125,000,000. After sinking fund provisions there remained about \$91,000,000 which has been made available in Canadian dollars for the purchase by Britain of supplies in Canada. The balance of the loan is to be used by the Dominion for initial financing of its war purchases.

Other loans, it is said by Canadian financial authorities, will be issued from time to time as occasion requires and as the financial condition of the country warrants the belief that private investors, rather than the banks, can absorb them.

Long-Range Development

While the principal occupation of Canadians is the short-range view—the duration of the war—there is also a widespread belief that Canada's long-range development may be accelerated by the war provided its fiscal policies for the conduct of the war are wisely carried out so that the aftermath does not create new and more serious problems. There has been talk to the effect that Canada may become the "arsenal" of the British Empire. This is a development that only the future course of the war will determine, but it is recognized in Canada that the British Isles are a potential battleground, and, if they should prove to be vulnerable to airplane attack to the extent that industries vital to the successful conduct of the war are seriously affected, then Canada might well become the mainstay of the British Empire in the manufacture of implements of war not only during the duration of the war but afterward. This

is a contingency that exists as yet only in imagination; nevertheless it is being given consideration by Canadian officials even to the extent that some vital British plants might be relocated in the Dominion.

Foreign Capital Encouraged

So that the foreign exchange regulations promulgated by the Foreign Exchange Control Board may not entirely discourage the investment of foreign capital in Canada, these regulations have recently been relaxed. To quote the board's order:

"While it is obvious that the board cannot give an unconditional guarantee in advance that foreign exchange will be provided at any time, it is the present policy of the board to sell foreign exchange where the following conditions are present:

"Foreign exchange might be sold by a non-resident to an authorized dealer subsequent to Sept. 15 and the resulting Canadian dollars invested in an entirely new undertaking such as the building of a manufacturing plant or the development of mineral resources or in a new addition or extension to an existing plant. The investment must create a new capital development in Canada. This would not include purchase of real estate or other property in expectation of an increase in value nor the purchase of securities except as this may be incidental to the new capital development. If the non-resident subsequently sells or liquidates the undertaking, foreign exchange would be sold up to an amount not exceeding the original investment."

This relaxation of the regulations it is believed will open the way for the investment of foreign (particularly United States) capital in the development of Canadian mineral resources and manufacturing.

St. Lawrence Waterway Revived

Canada's long-range industrial development may be enhanced by the fact that Premier Hepburn of Ontario has withdrawn his opposition to the St. Lawrence waterways and electric power plan. Once an implacable opponent of this project, Premier Hepburn has now become one of its strongest advocates, as a result of which negotiations with the United States Government will be resumed. Canada's probable increased need for water power for its expected industrial expansion is a factor in the revival of this project, which would cost about \$500,000,000 and would require five years or longer to build.

MOLD . .

YOUR . .

OWN . .

PLASTICS . .

By HERBERT CHASE

THE molding of plastics is a relatively simple operation, but numerous considerations enter into the decision of whether a particular small plant should do its own molding. To facilitate making the decision, this article discusses types of machines available, and consideration to be given types and quantities of products to be made.

EVEN though the molding of plastics is a comparatively simple process, it nevertheless presents peculiar problems. Furthermore, the economic aspects of the process require careful consideration, if profitable operation is to result. It is, for example, difficult to make any manufacturing equipment, plastic molding machines included, realize a return upon investment as well as amortize itself within a reasonable period of time unless there be assurance that the equipment be kept relatively busy during its useful life.

A great many considerations enter into making a wise decision as to whether a manufacturer should do his own molding, but, having decided that the matter is at least worthy of investigation, there must first be determined what equipment is needed or will do the required jobs to best advantage, and, second, what is involved in operating it profitably.

The character of equipment to be

chosen depends, among other things, upon the size and type of moldings required, the rate at which they must be turned out to keep step with production requirements, the character of plastic to be employed and the methods by which they will be handled between the time they are received and that at which they are converted into finished articles ready for shipment. If a plant plans to make its own molds, proper machining equipment will have to be provided if not already available. Besides presses for actual molding, and means for supplying them with power to operate, provision for heating molds or the plastic outside of the molds, or both, are required; and, often, supplies of cooling water and of compressed air are necessary. For economy it is frequently essential to provide machines for pre-forming ("pilling") the plastics and sometimes for pre-heating them just before they are introduced into the mold. When the charge is not pilled, it usually has

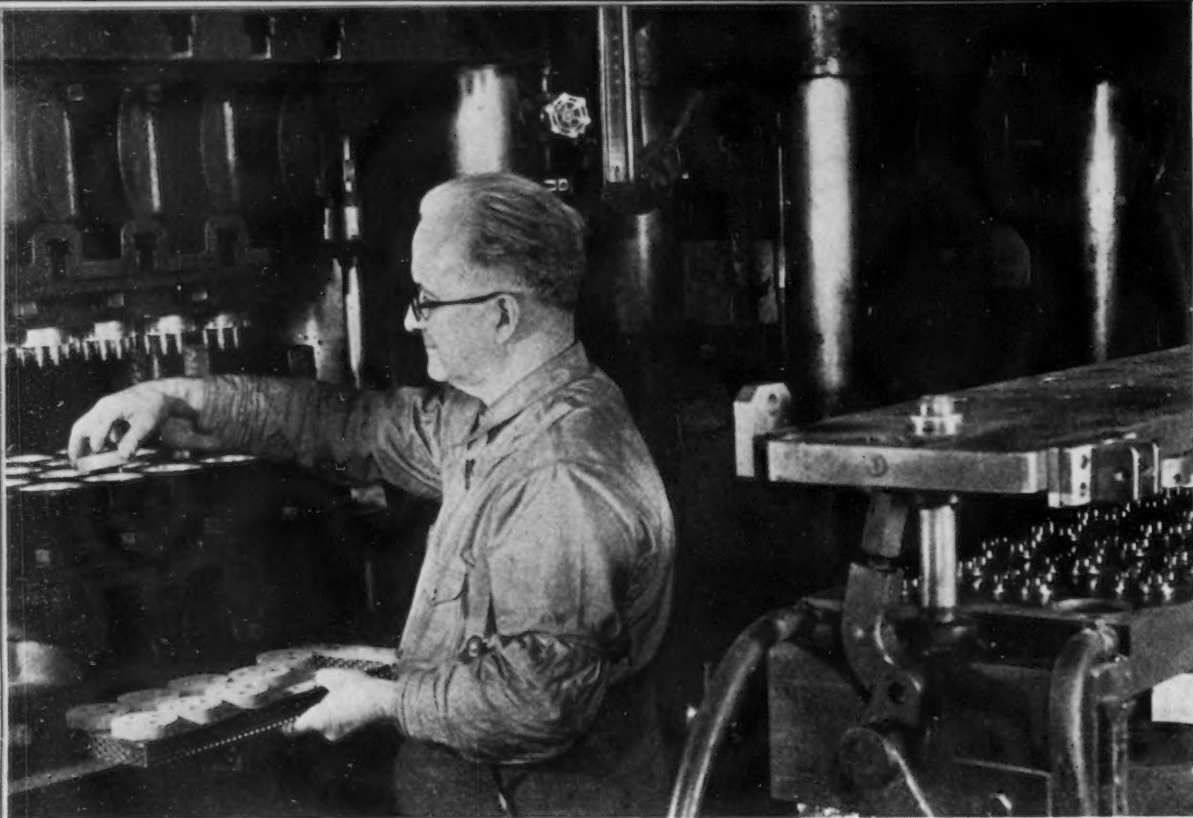
to be weighed out although, under some circumstances, it can be measured by volume with a saving in time and cost.

Following the molding, plastics often require some machining and nearly always the removal of fins. For this reason, departments devoted to such work must have their quota of equipment. Often the space required for these operations is as large as or larger than that devoted to molding.

Quite aside from the matter of molding and doing the supplementary work on molded parts is that of providing skilled labor. Trained molders and foremen who understand plastic molding are not available everywhere, and, if they must be trained, the cost of so doing must be taken into account.

Such are some of the general considerations to be studied before proper decisions as to undertaking molding work can be made intelligently. Having given these factors proper attention, the next step is to determine precisely what equipment will meet specific requirements best.

Until quite recently, practically all molding was done by compression in relatively simple hydraulic presses. In fact, much the larger proportion is still done in this fashion. Within the



VIEW in Ford Motor Co. plant showing at left one of the many conventional compression molding presses served from a common hydraulic power and heating source. Large pre-forms are being used to mold ignition distributor parts, some of which may be seen in the hand-toggle cooling press at the right. The press is used to prevent distortion in cooling.

past few years, however, numerous presses, or machines, have been developed for injection molding and, for certain classes of work, they are both rapid and economical although more limited as to the choice of plastic and the size of parts molded than are compression presses.

Most molding plants of large size, including many operated by electrical manufacturers who do their own molding, have them equipped with hydraulic presses served by a central hydraulic system and a central plant for supplying steam or hot water under pressure for mold heating. If these are not available, they must either be provided or some equivalent supplied. In recent years there have become available many self-contained presses having their own means for applying pressure and moving platens, although still requiring either an external supply of heat or equipment for applying heat by electrical means. Naturally, these forms of presses are more expensive in themselves than presses not having built-in supplementary equipment, but, at least in small installations, they may prove more economical than to use conventional presses served by outside sources, especially if the latter are not available already in the plant. In any event, their use should be considered in comparison with more conventional equipment wherever new molding facilities are to be installed.

Where molding on a large scale is contemplated and new plants or new

departments are to be equipped, experience seems to point to greater economy in providing central hydraulic and heating installations, but even then some self-contained presses or molding machines may be used to advantage. This, in any event, is the practice most common both in old and new plants of large size. Where only one or relatively few presses are needed, self-contained units may be the best or the only feasible alternative, especially if the plant does not have already a high-pressure hydraulic system and means for supplying heat from a central source.

Many factors enter into making a choice as between compression and injection molding equipment or deciding whether both forms shall be employed. At present, compression molding is by far the most important type and has the advantage that it can be used with any plastic, whereas injection molding has been confined in this country to use of thermoplastics, at least in any but exceptional commercial forms or in processes still in the experimental or development state. A rather special form of injection molding with thermosetting or thermoplastic plastics (sometimes referred to as "transfer molding") can be done on conventional compression presses, but such work is quite limited and in a rather special class and need only be mentioned here. When ordinary compression molding is done with thermoplastics, the material has to be heated in the mold and cooled after

removal. Cooling lengthens the cycle, but is entirely feasible and widely employed especially with large parts made from thermoplastics.

Injection molding has been gaining rapidly in importance with the introduction of many new and highly developed machines for this purpose. It has the important advantage of rapidity in molding, since the thermoplastic is heated outside the mold and forced into it (while in viscous dough-like form) under heavy pressure. The mold is kept cold or cool, and as the plastic hardens quickly when chilled by the mold, the latter can be opened and the molding or moldings ejected almost as soon as the mold is filled. Cycles of ten seconds or shorter, have been attained with small parts; whereas, in most of the compression molding, cycles of one to five minutes or longer are ordinarily required. The rapid cycle in injection molding makes it possible to use a relatively small mold having one or several cavities, depending on the size of moldings required, and still attain a high rate of production. Side cores, even of small size, may be handled, and some parts not feasible to make by compression molding can be injection molded.

On the other hand, injection molding has its limitations, an important one being the rather slow rate at which the plastic can be heated. This limits the quantity injected per cycle and has thus far limited applications chiefly to pieces of quite small size. Pieces or groups of parts in multiple-cavity

molds made with a single-ram machine and weighing up to $\frac{1}{2}$ lb. can be produced and, by using four rams, pieces weighing about 2 lb. have been made. This, however, lengthens the cycle to about one minute and involves an expensive installation. Nevertheless, the duration of the cycle is short as compared with that in compression molding. It probably would require five or more compression presses to turn out an equal number per hour of thermoplastic parts weighing 2 lb. per piece. Still, in the present state of the art, there is little doubt but what injection molding is best adapted to the production of small parts. It has been used to some extent in applying molded coatings over metal and with inserts, such as glass lenses, which could not be handled in compression molding.

Injection molding requires high injection pressures because the heated plastic is exceedingly viscous; this, in turn, necessitates a sturdy machine capable of exerting sufficient pressure to keep the mold closed. Injection pressures usually run from 10,000 to 20,000 lb. per sq. in. or higher. Thus, there is required special pumping equipment which is built into the machine. Heating is usually done by electric means. Most machines have built-in resistance heating units, but one maker is employing induction heating. Many injection machines are equipped for automatic operation, but in general they require considerable attention and frequently it is necessary or found more economical to keep an operator at each machine, which he is likely to operate without automatic devices.

Machines for automatic compression molding of thermosetting plastics have been in successful use in certain more or less isolated instances for several years, but not until quite recently has there been available commercially a machine of this type designed to mold a considerable variety of parts of small to medium size. This machine already has attained extensive use. It is designed to operate with powdered or granular materials continuously and without attention for long periods with no other attention than that required to keep its hopper supplied with plastic. It is deserving of consideration for certain classes of work not only because it is automatic but because it is, except for connection to power lines and to a supply of compressed air, completely self-contained and not dependent upon connection to any hydraulic system. This makes the machine adaptable in plants where,

if hydraulic presses were employed, it would be necessary either to use the self-contained type having its own pump or to install a separate hydraulic system.

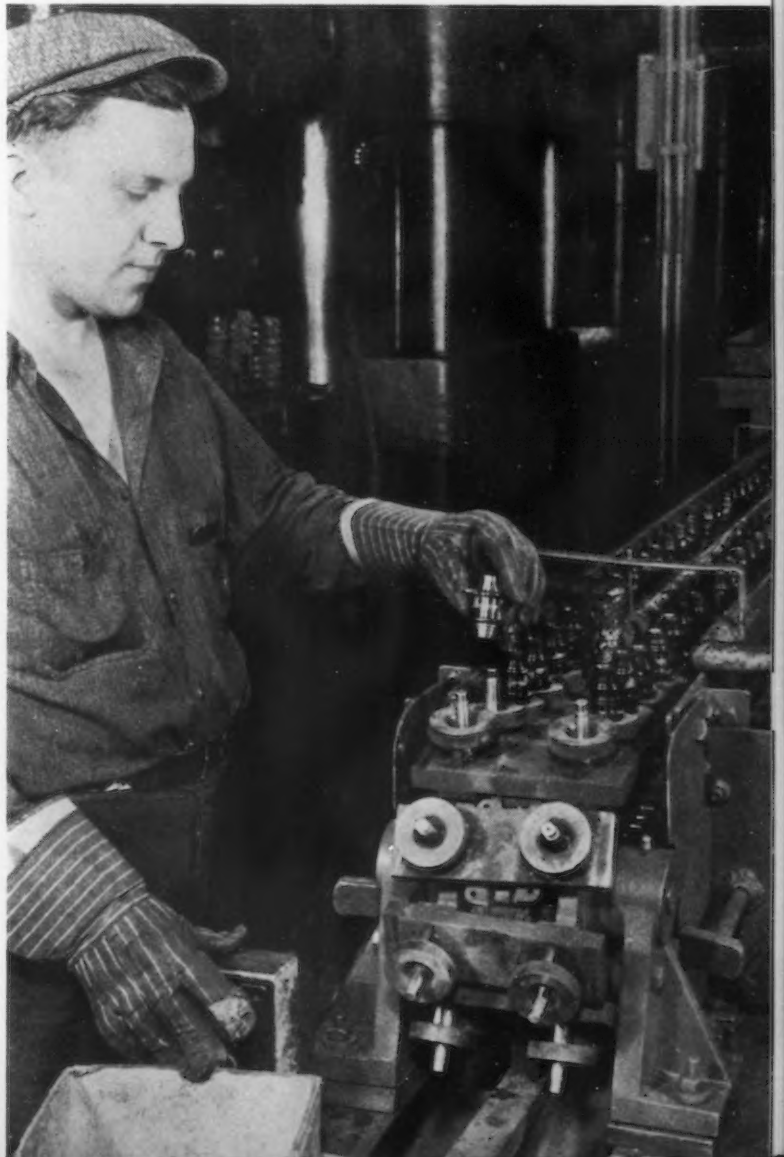
The type of press referred to, though self-contained, is mechanically rather than hydraulically operated. The movable platen is raised and lowered by an electric motor and a mechanical drive, and pressure is applied through heavy coil springs which are compressed mechanically by the same motor to maintain the pressure on the plastic while it is cured. At the end of the cure, the press opens automatically, the molding is ejected, the mold blown out with compressed air, a predetermined amount of plastic is admitted from the hopper, and the mold is again closed, thus repeating the cycle. Mold heating is electrical as a rule, but steam heating is also satisfactory. The length of the molding cycle depends in large part upon the time necessary to cure the plastic and can be at least as rapid as conventional compression molding. If the plastic is such as to require "breathing" (momentary opening of the mold to expel

gas generated within it) this is readily done and is included within the automatic cycle when setting up for the molding of a particular piece.

Since this type of press requires a minimum amount of labor in operation, labor charges are low and savings on this score are said to be such as to justify the molding of some parts in quantities smaller than it would be economical to mold by non-automatic means. On the other hand, there is a definite limit to the size of part which can be molded with a given type of material and if the part is one which requires one or more metal inserts, these would have to be placed by hand, as in other types of molding, thus presumably sacrificing whatever advantage may be gained otherwise by minimizing labor costs.

Other types of presses designed partly or entirely for mechanical operation in compression molding are available, but not so far as the author is aware, for automatic operation. Some types have been built for operation by compressed air, but the author does not know of any which

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FORD employs this specially built conveyor fitted with jigs on which ignition rotors are cooled to avoid distortion. Elaborate equipment of this kind is seldom required for ordinary molding work.
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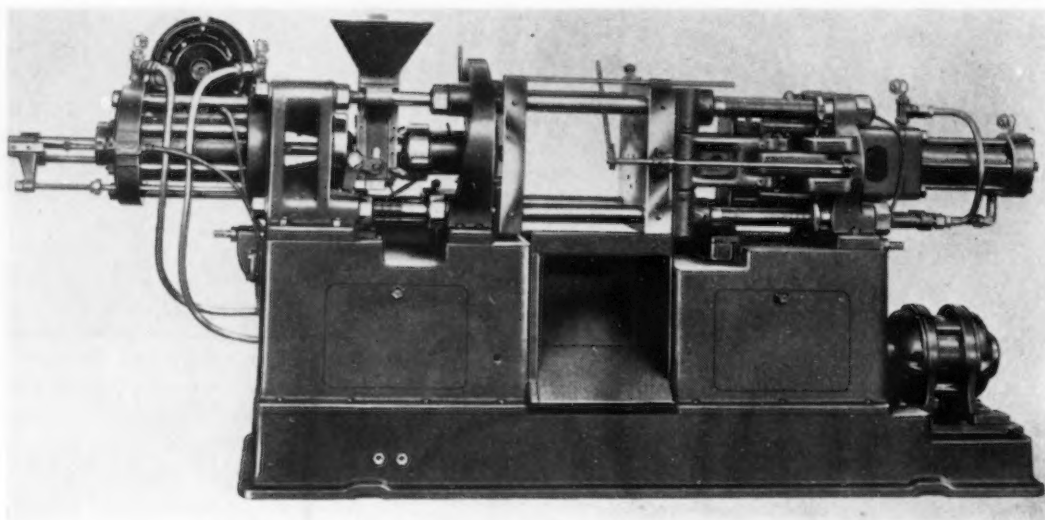
have been made generally available on a commercial scale.

Space limitations preclude an extensive consideration of equipment supplementary to that involved in molding, but some comments in this regard may be made. The use of preforms not only makes it unnecessary, as a rule, to weigh the charge, but also

Pre-heating of preforms usually is carried out either in ovens or on hot plates adjacent to the molding press, their temperature and the time of pre-heating being adjusted, of course, to avoid fluxing or undue softening of the pills but still to have them at a temperature high enough to bring about rapid fluxing within the mold.

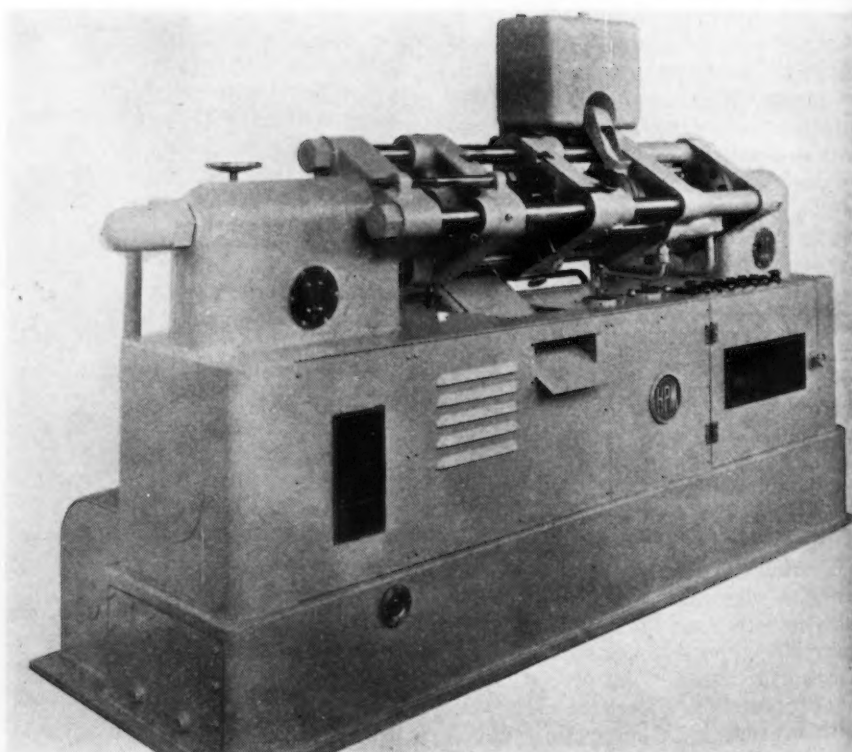
Preforms, by bringing the particles of plastic into intimate contact, increase the rate of heat transfer during pre-heating and during heating in the mold.

Even thermoplastics, which have to be cooled before removal from the mold, are still, as a rule, well above room temperature when taken from



ONE of several models of Reed-Prentice injection molding machines. Molds are opened and closed by hydraulically actuated toggles and injection is by a hydraulic ram at left.

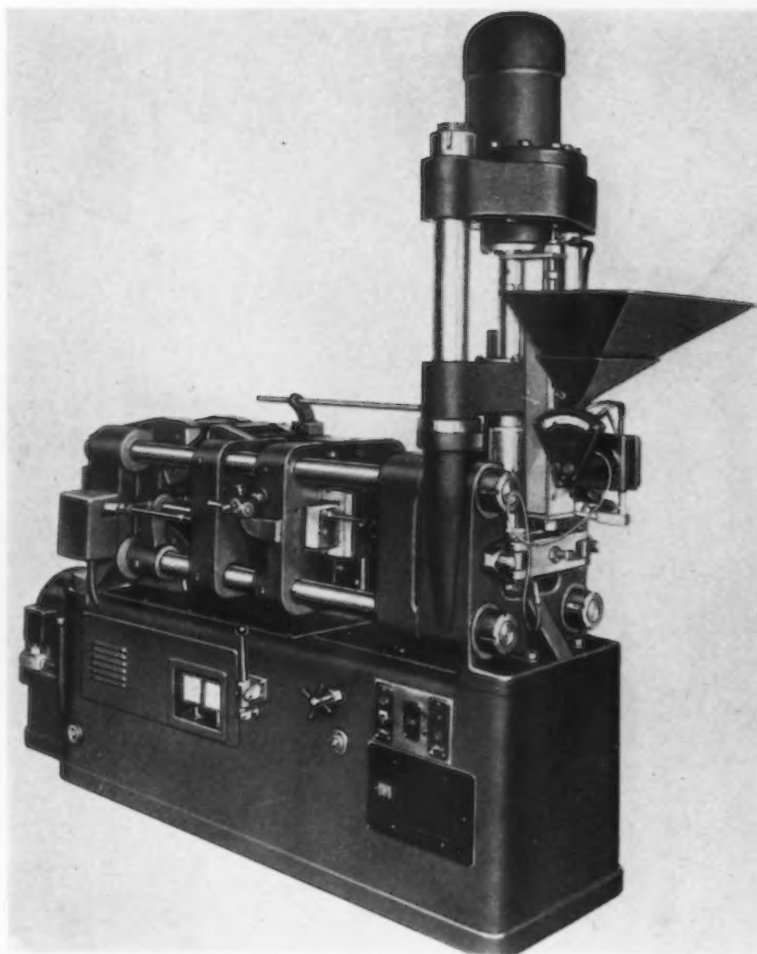
helps to facilitate handling, to reduce dust in the molding room and sometimes to shorten the molding cycle, especially if the preforms be pre-heated. Plastics in powdered or granulated form can be pre-heated, but handling is facilitated by the use of preforms. Selection of "pilling" presses depends largely upon the size of "pills" to be made and the quantity in which they are required. Some presses for making pills turn out a large number of small size, usually of cylindrical shape, per unit of time. Another type makes a smaller number of larger preforms per hour, but can be equipped with dies which shape the preform to fit the mold or make it into large cylindrical pills. Dies of the desired shape are of course fitted into the machine for each different shape of pill needed. Often several pills are used in charging the mold cavity, and, where many cavities are employed in the same mold, it is quite common practice to use a loading frame arranged with a slide which is pulled when the frame is in place, dropping a preform into each cavity. In such cases, the molder reloads the frame while the previous charge is curing, thus making use of time during which he otherwise would be idle.



H. P. M. injection molding machine of rather small capacity (2 oz. per shot, maximum). Heating capacity is 20 lb. of plastic per hour, maximum. The same make of machine is produced in various models of larger capacity, some having two and some four injection units. Molds are operated by direct hydraulic pressure without toggles.

the mold, and thermosetting plastics are ejected at a still higher temperature. In subsequent cooling, considerable shrinkage occurs and has to be allowed for in making the mold. This shrinkage may result in warpage, especially in parts having large flat surfaces or those having marked variation in section thickness. To prevent this distortion, moldings sometimes have to be cooled over forms, in clamps, under weights or in cooling presses. Facilities to care for this often have to be provided, especially where the warpage may become sufficient to be noticeable or to interfere with subsequent assembly to other parts. Wooden forms on which cooling can take place are sometimes adequate (if any be required) but in other cases steel forms are needed. Cooling is sometimes hastened, when forms are used, by a blast of air or even by immersion in water, but if no form for cooling is used, slower cooling with protection against drafts tends to minimize warpage.

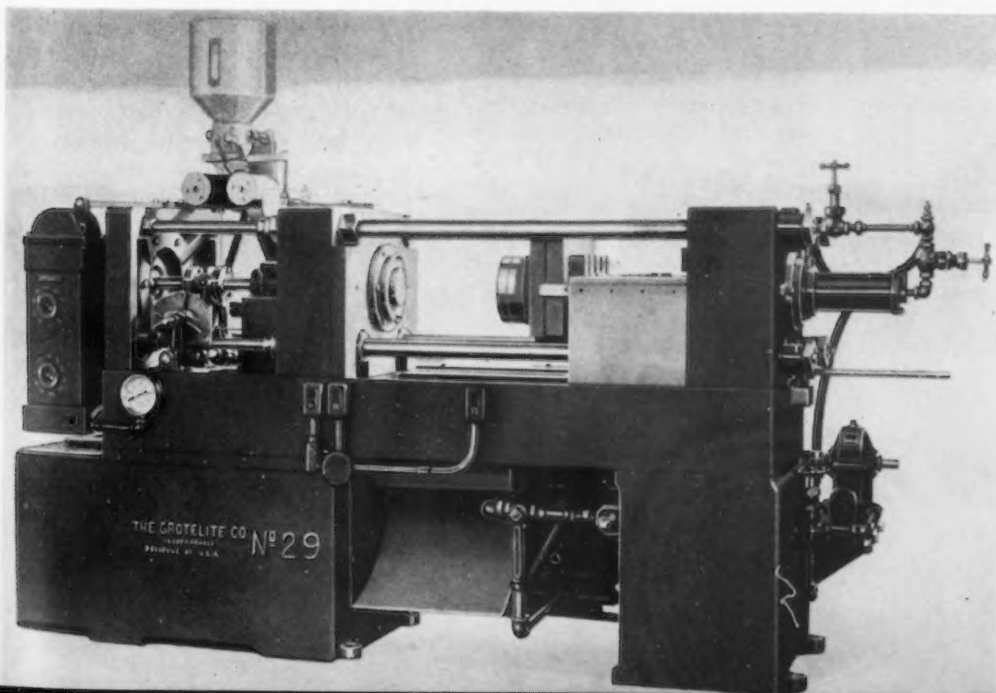
Some provision for fin removal is required on nearly all compression moldings, but those made by injection methods are usually free of fins if mold parts are well fitted and properly locked and air vents are properly placed. On the other hand, injection moldings come from the mold with sprue and runners attached to the molding. Even though the runner be made as thin as feasible where it is attached to the molding, if it merely be broken off, the molding is likely to be marred; hence, unless the blemish is at a point where it is not of significance, being, perhaps, unseen in the piece as it is used, the runner must be cut off by a tool or machine or the blemish removed by sanding or by some similar means.



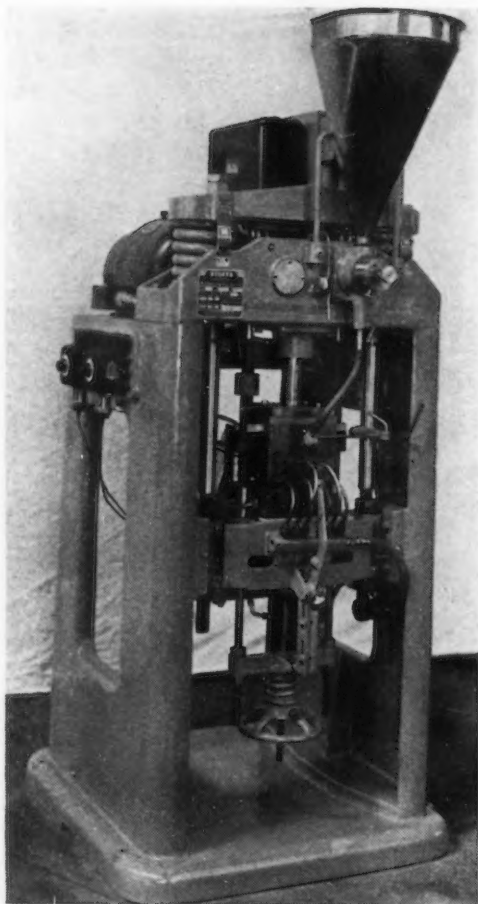
LESTER injection molding machine of high velocity. It is unique in that injection is effected by a vertical hydraulic ram. Molds are opened, closed and locked by a toggle mechanism.

Flash on thermosetting plastics is usually quite thin and so brittle that it can be broken away easily, but this too leaves a rough or saw-tooth edge which usually requires filing or sanding and often some buffing, especially when the flash line is in a prominent

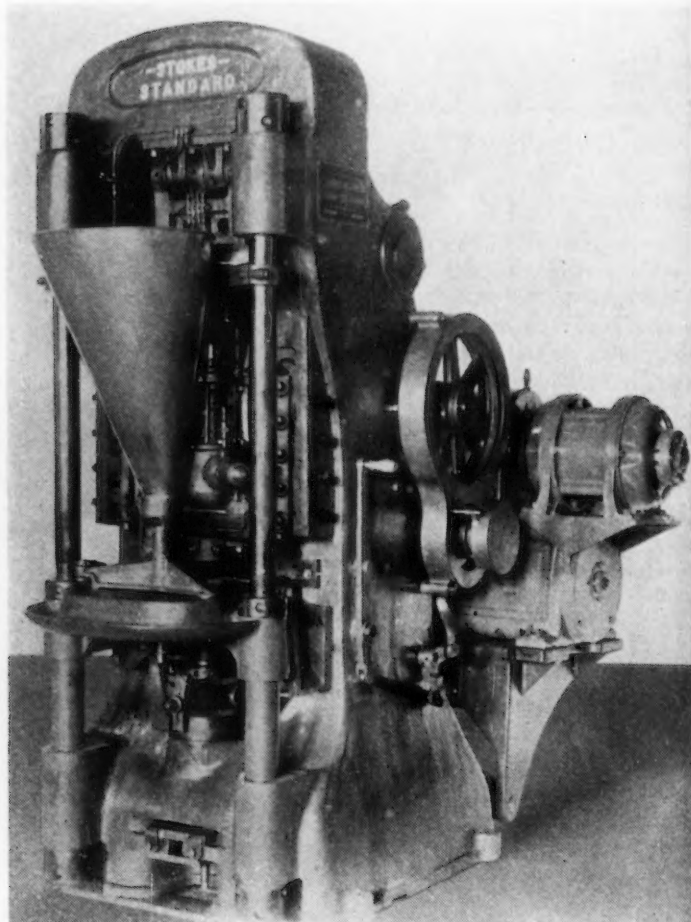
position. In the modern telephone receiver-transmitter assembly, which is molded, a special tool is used to cut a shallow groove around the piece at the flash line, as this avoids the polishing that would otherwise be necessary after flash removal. Small parts, such



LA TE type of Grotelite injection molding machine which employs mechanical rather than electrical control units. Molds are moved by direct hydraulic means and are locked by a wedge which is also actuated hydraulically.



STOKES automatic compression molding machine for thermosetting plastics. This machine meters the charge, fills the mold, closes it under pressure, opens it for breathing, if required, cures the part, ejects it when cured, blows out the mold, and repeats the cycle automatically. Single-cavity molds are used and parts up to about 3 in. diameter can be molded. The machine is completely self-contained, when provided with electric heating units, except for supply of compressed air.



ONE of the F. J. Stokes tableting ("pill-ing") machines designed for making large pre-forms, at a rate of 35 to 50 per min., this being a single-punch type. Other higher speed machines for making smaller pills are available.

as attachment plug caps, are usually tumbled to remove flash. This is sometimes done in open inclined barrels and sometimes in closed barrels in which an abrasive and/or polishing compound may be employed, depending in part on the type of piece and on how the flash line must appear to be acceptable.

One of the most common ways to remove flash is by using a light belt sander. This is especially useful when the flash comes at an edge of a flat face. In general a light, inexpensive sander is adequate. A type which permits of varying the angle of the belt from vertical to horizontal is often convenient for a variety of work. Some parts require considerable hand filing or hand sanding. On large parts this is sometimes avoided by using instead a small wheel on a flexible shaft. Removal of flash on circular parts is sometimes done most rapidly on a light lathe, especially if the part

lends itself to rapid chucking. Disk sanders are sometimes used to advantage. Fins which are left in through hole cored in moldings are removed, as a rule, with a drill, reamer or countersink in a light drill press, but the work can also be done with hand tools. This latter may be the most economical, especially if the holes are not circular.

Holes which are in a position such that they cannot be cored readily are often drilled. This is commonly done on a light drill press which is also employed for tapping and reaming, whether the hole be drilled or cored. Occasional parts require turning or external threading operations, and this is done most conveniently in light lathes. Parts which have not sufficient luster as they come from the mold are often polished on a muslin wheel, using a polishing compound, or they may be given a satin finish by "ashing" on a wet wheel with pumice.

As will be seen, most of the finishing operations are quite similar to or identical with those required on many metal parts and identical machines can be used for most operations. In some cases, either special tools or standard tools with special grinding attachments facilitate the work, but a plant already well equipped for metal working is not likely to require much new equipment for finishing plastic parts already molded unless, of course, the equipment is kept too busy in metal working to accommodate extra work on plastics. On the other hand, if a large department devoted to the molding of plastics is to be installed, there is quite sure to be regular use for a supplementary department especially equipped with machines for removing fins, polishing and doing such other operations as may be required on the moldings as they come from the molding presses.

NOVEL SPOT WELDING OF GAR WOOD DUMP BODIES

STANDARD dump bodies are now being assembled by spot welding at the truck plant of the Gar Wood Co. in Detroit as the result of development of special deep throated swivel-electrode guns of high capacity. The development has permitted the extensive use of formed steel gusset and reinforcing plates in standard bodies, insuring high body strength without the use of heavy structural shapes. Steel is generally of 10 gage and comes formed to the welding department on portable, tilting-top carrier which accommodates either a right or left-hand floor section and side.

The first gun in the production line is used to weld outriggers to right and left-hand floor sections. In order to permit the welding electrodes to clear the bottom channel, the support bracket for the upper electrode is carried in the gun frame in such a manner that the electrode can be swiveled to a horizontal position. When the upper electrode has cleared the channel, the electrode is turned back to vertical welding position as shown in the upper photo. After welding the outriggers, the gun is removed and the work tilted to bring the body side into horizontal position for welding the braces to the body sides.

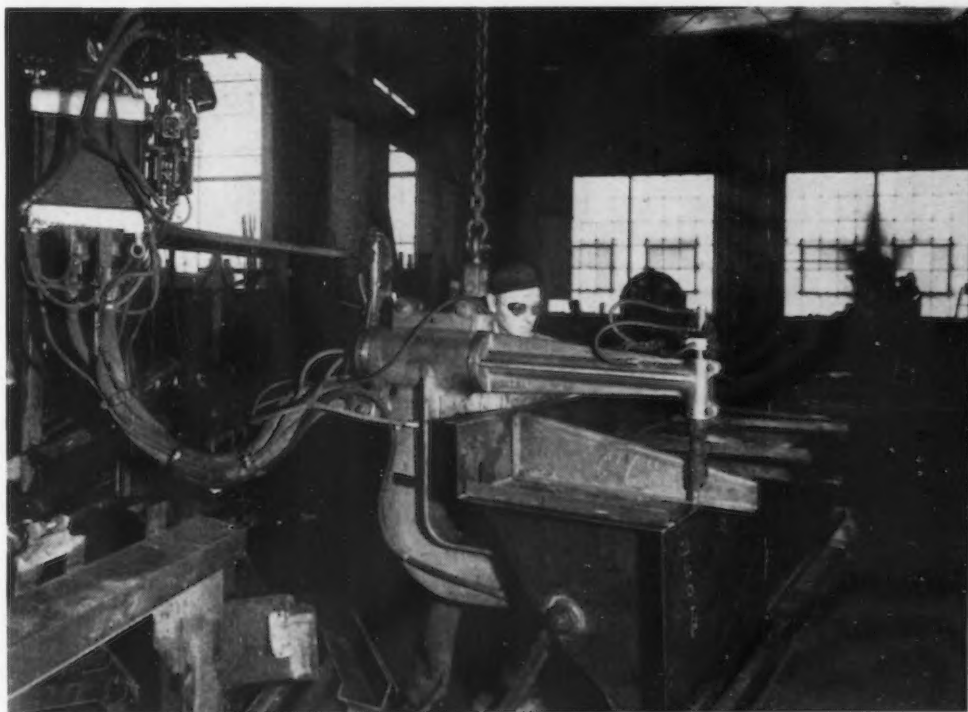
The same gun is also used for welding cross members to center floor sections, the swivel feature of the gun again permitting the gun to clear the depth of both left and right-hand channels formed out of the floor center. The flexibility and clearance of this special gun is due largely to the use of sliding internal electrical contacts in the gun proper, greatly simplifying the design and permitting incorporation of rigidity in the gun frame.

Another interesting type of gun is illustrated below—for welding the front of the body to the body sides and joining back braces (tacked in position by arc welding) to the body sides. For this work the gun is suspended on a

bowed support which tilts the gun away from the vertical, so that spots can be made close to sharp angles. This gun is also designed so as to permit the jaws to be swung open to admit exceptionally deep work on special body types and then closed and locked for welding.

There are two other pincher type welding guns (not illustrated) used at Gar Wood for intermediate work

on the standard dump body. All four guns were made by the Progressive Welder Co., Detroit, and are equipped with Weldtronic timers. These timers are of the auto-interrupting type to permit the use of several successive short cycle shots of current during the welding of a single spot. Arcing is eliminated by the use of high welding pressures secured through air-hydraulic boosters.



HOW TO INCREASE

IN this second section of a two-part article, the author contributes ideas on improved fuel practice for the open hearth, possible changes in pig-scrap ratio and a variety of suggestions for electric furnace production. Last week, mention was made of possible changes in open hearth and bessemer construction and operation.

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TO secure maximum flame temperature, the long flame formation of the older open-hearth furnace ports (Fig. 1, top: the first three ports) must be replaced by cross current combustion such as is induced by Moll or Maerz ports by the crossing of the gas and air currents or a short hot flame can be obtained by supplementary induction in the manner of a Venturi tube by almost parallel gas and air blasts. Also precombustion chambers can be arranged between port and hearth to obtain a hot combustion before the colder charge reduces the temperature.

Apart from appropriate arrangement of the burners the maximum flame temperature may also be further approached by an improvement in the preheating of the gas and air. Research during the past decade has pointed the way. In cases where Siemens regenerative chambers are used for preheating they must, to ensure uniform "drive," not be too wide and should be tall and chimney like to ensure good heat transference. Where space is lacking the long period of contact of gas and brick and the effective heat transfer is aimed at by the use of special bricks with a large surface area and a zig-zag path for the gases.

⁴ E. Hoffman and M. Paschke, *Stahl und Eisen*, 59 (1939), pp. 417-26; M. Burchardt and M. Paschke, *Stahl und Eisen*, 59 (1939), pp. 565-73.

⁵ Unpublished.

⁶ C. Kreutzer, *Stahl und Eisen*, 57 (1937), pp. 1397-1404; E. Wulppert, *Stahl und Eisen*, 57 (1937), pp. 1165-71, 1195-1201.

⁷ *Stahl und Eisen*, 57 (1937), pp. 1449-52; E. Lange, *Stahl und Eisen*, 58 (1938), pp. 1361-65; P. Bremer, *Stahl und Eisen*, 58 (1938), pp. 1365-69.

⁸ *Stahl und Eisen*, 56 (1936), pp. 965-70.

⁹ Sheffield Steel Corp., Kansas City, Mo., has experimented extensively in this direction, particularly with scrap charges. —Ed.

Recently, preheating of gas and air has been carried out by recuperators instead of regenerators, whereby the heat transference conditions and the air induction can be so accurately controlled that instead of working with a preheating temperature of 1832 to 2192 deg. F. in the regeneration furnace, with recuperator furnace temperatures of 1454 to 1598 deg. F. can be used. In Fig. 2 is shown a furnace designed for cold gas from the grid supply, and hot air, and therefore has only one recuperator.⁴ When using mixed gas or blast furnace gas the furnace must, of course, be equipped with two recuperators. The recuperative furnace may, moreover, since it is not dependent upon the arrangement of the burners and vents, have a considerable effect upon the future development of the present design of the open-hearth furnace. The furnace shown in Fig. 2 (shown last week) could be built as a Brackelsberg furnace or electric arc furnace in the form of a well insulated cylinder with arrangements for rapid charging which would afford particularly high outputs with good heat consumption.

The selection of fuel and preliminary treatment also offer possibilities of increasing the combustion temperature and consequently the furnace output. For instance, coke oven gas in furnaces using only this gas could be preheated before use. The combustion atmosphere could be enriched with oxygen thereby shortening the melting time and its particularly high requirements of heat, and accelerating the melt. The varying calorific values of the fuel could also be equalized and lean gases, for instance blast furnace gas, could be used as the sole fuel for open-hearth furnace by oxygen enrichment of the blast. Experi-

ments⁵ have shown that steel melting with pig iron and scrap is possible with blast furnace gas and oxygenized air even with preheating to only 1292 to 1472 deg. F.

Only if the heat transfer is utilized to the fullest extent possible can the intense heat of the flames in the open-hearth furnace be exploited to the full, and this maximum value of the heat transfer goes, according to the latest research report, hand in hand with high flame luminosity. This means that the open-hearth furnace must have a not only hot, but also brilliant flame if it is to yield the best heat transfer. For this reason with producer gas furnaces the gas plant must be operated at a low temperature so that the hydrocarbons may reach the furnace uncracked and burn there with a bright flame. With colorless burning coke-oven gas the flame can be made luminous by preliminary cracking (Steinhauser furnace) or the same effect of luminosity can be obtained by carburizing the gas with oil, coal dust⁶ and recently successful attempts have been made with pitch.⁷ In the same way open-hearth furnaces using blast furnace gas take advantage of carburizing to make the flames luminous and raise the output. Water vapor which dulls the flames should be prevented from entering the open-hearth furnace, for instance, by preliminary drying of the hot cleaned blast furnace gas.

Only a furnace with low heat losses can utilize to the full high flame temperature and good heat transfer for the purpose of increasing output. Accordingly, the open-hearth furnace with its high working temperature should be protected by insulation. The importance of design with regard to insulation is often mentioned in descriptions of recuperative open-hearth furnaces. Besides this, however, the refractory brickwork must be able to withstand the heat accumulation caused by the insulation which is not the case with silica bricks normally used. Therefore, high grade materials such as magnesite, chrome magnesite, sillimanite, etc., should be installed in

STEEL PRODUCTION

greater quantities than has been customary up to the present.

With the introduction of the improvements just mentioned it will be realized that an increase in efficiency generally requires an increased input of gas over a given period, and in consequence a corresponding enlargement of the dimensions of the gas conduits, valves,* dampers and an increase in the height of the chimney will have to be considered.

Metallurgical Measures.—It is not proposed to deal here with the question of raising the efficiency of the open-hearth furnace by speeding up the charging and furnace repairing nor with what the steel expert can do with various qualities of steel to accelerate matters by the correct metallurgical control of the melt, but only with the selection and preliminary treatment of the charge.

The scrap determines the operating speed in many open-hearth furnaces and should therefore be systematically improved. Even a simple classification of good and bad, light and heavy scrap, such as is sedulously practiced by American works, can shorten the charging and thus the entire melting time; still greater time saving can be effected if all bulky and light pieces are broken up or compressed. The gain would be still greater if, in conjunction with this, the scrap for the furnace could be preheated or even melted. Furnaces and machines have yet to be developed for this kind of scrap preparation for which blast furnace gas and other low grade fuels could be profitably utilized.

Of even greater importance to the output of the open-hearth furnace is the quality of the iron employed. The use of hot metal instead of solid pig iron can easily raise the melting efficiency by 10 per cent. On this account it pays to melt the pig iron in a special furnace before charging into the open-hearth furnace; E. Herzog gave practical proof of this some years ago. He used an old cupola for this purpose. The chemical improvement of the pig in which a high manganese content but little phosphorus,

By GEORGE BULLE

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silicon or sulphur is required, can be achieved in an efficient manner by the methods adopted to improve the specially important pig-scrap ratio. It is known that with too small or too great a proportion of pig in the charge the open hearth furnace will not function satisfactorily and the maximum efficiency is obtained with an average amount of pig of about 20 to 40 per cent of the charge. Therefore, to obtain the maximum efficiency in the open-hearth furnace if too little pig and too much scrap are present an attempt must be made to recarburize the scrap before charging. It is not yet ascertained in what manner such carburization may be most economically effected. Scrap might, for instance, be well premelted in the cupola furnace* so that this material would become somewhat like pig iron, or scrap could be converted in a scrap blast furnace in which the scrap preponderates in the burden. A number of American blast furnaces operate with a high percentage of low-grade scrap.

In cases where too much pig-iron and too little scrap are present there are several proved methods of adjusting the pig-scrap ratio from the point of view of maximum efficiency for in this instance the preliminary decarburization before charging into the open-hearth furnace is relatively easily done; for example, solid pig can be decarburized at about 1650 deg. F. Bo Kalling carried out this process not in the slow and simple way using ore as a decarburizing agent but more rapidly using an oxidizing flame (blast furnace gas suffices as fuel).

Alternatively it is possible to install, as in English practice, an active mixer by the open-hearth furnace which removes silicon, some carbon and manganese and heats the pig iron. Another possibility is to use the Georgs-Marienhütter process (generally abandoned owing to cost) in which a preliminary refining furnace removes sili-

con-manganese and half the carbon from the pig, or as the Americans do when operating at high pressure, blow the silicon, manganese and carbon out of the pig iron in a Bessemer converter. Finally, a method can be adopted which is now being much used in Germany; this is to produce molten scrap in a basic converter by blowing out silicon, manganese, carbon and phosphorus.

The reconditioning periods play an important part in the efficiency of the open-hearth furnace. If this time does not total 40 per cent of the total time, as is the case with a basic converter, it takes usually 20 per cent. A particularly large part of this time is taken up with repairs to the preheating chamber and slag chambers; therefore, the recuperative furnace, which operates without these, can be considered to require definitely shorter repairing times and to give a greater annual output than a regenerative open-hearth furnace of the same size.

Endeavors are also being made to cut down the reconditioning periods by prolonging the working periods; constant supervision of the open-hearth furnace to avoid excessive wear is rewarded by an increased annual output. Also efforts are now being made to increase the working period and annual output by:—

(1) Use of the already mentioned highly refractory materials such as magnesite, chrome-magnesite, sillimanite, etc.

(2) Water cooling of the parts of the furnace most liable to wear—ports, channels, frames, etc.

The reduction of reconditioning periods by economically practical means such as the rapid cooling of old furnaces, the rapid delivery of materials and construction of the new lining offers possibilities of increasing efficiency in both basic Bessemer and open-hearth plants.

Electric Steel Plants

The electric arc furnace which seemed certain even ten years ago to supplant the open-hearth furnace has frequently been supplemented by small

open-hearth furnaces to maintain satisfactory outputs. Only recently have electric arc furnaces been built in America with three electrodes and of 50 tons (metric) capacity, and coreless induction furnaces of 10 tons with designed hourly outputs of up to 8 tons per hr. using a molten charge; this as compared to an open-hearth furnace of 60 tons capacity with an output of 10 tons per hr.

The output of electric arc furnaces can be considerably increased by improvements in design and operation while, in conjunction with numerous small improvements to the electrodes and furnace crucible, an increase in output has been obtained recently by an enlargement of the transformer which permits a reduction of the melting period. Beside this, the furnace crucible can be designed to rotate so as to let the hot electric arc take effect on the various parts of the charge in turn and thus increase the rate of melting. The furnace cover can also be made liftable and the crucible or the cover made removable so that the solid charge prepared in baskets can be put in the furnace in a few minutes.¹⁰

In contrast to the open-hearth furnace, the electric steel plant does not require pig iron in the charge as a swirling of the bath by the refining is hardly necessary for the heat transfer. On this account no appreciable recarburization of the charge is required except for alloy purposes; on the other hand, the removal of carbon before melting in the electric arc furnace when using a pig iron rich charge is of greater importance. The primary refining of the charge, formerly widely practiced in the basic open-hearth furnace has now given way to the quicker method of refining in the basic converter. At the present time a large number of electric arc furnaces get their charge after preliminary decarburization by the so-called basic electric duplex process and this makes for considerably increased melting efficiency.

An acceleration of the deoxidation and the dephosphorization by vigorous combined teeming of steel and slag was recently recommended by R. Perin.¹¹

The reconditioning periods which were not formerly an item of great

importance when electric arc furnaces were only used in special steel works, must now be cut down as far as possible where these furnaces are used for the mass production of steel. By paying attention to maintenance and design of the cover, hearth and walls it can be so arranged that practically all reconditioning is confined to Sunday pauses with the result that the melting furnace is in production the entire year. In this manner the yearly output of the electric arc furnace has approached that of the open-hearth furnace.

Selection of Process

As has been mentioned above, the output with the basic Bessemer process is 80 tons (metric) per hr. calculated for the actual working time; for the total time, allowing 40 per cent for reconditioning, the output is from about 45 to 50 tons per hr. With the openhearth process the output for the actual working time is from 10 to 20 tons (metric) per hr., for the total time allowing 20 per cent for reconditioning it is about 8 to 16 tons per hr., and the electric arc furnace (duplex) output is 5 to 10 tons per hr. for the actual working time and from 5 to 10 tons per hr. for the total time.

It will be appreciated that to secure the maximum output of steel the converter or basic Bessemer process will be selected according to the phosphorus content of the pig, especially when it is recollected that the output of the basic steel plant has special possibilities of expansion. In actual fact, however, the open-hearth process is more commonly used while the electric arc furnace is steadily gaining ground.¹² The reasons are the following:

The open-hearth and electric arc furnace can work with pig and scrap while the converter process depends upon pig for raw material. Countries depending on scrap, such as Italy or Japan, must, if they are to use the converter process, first produce a pig iron from the scrap by employing a scrap blast furnace, for instance, which is exceedingly costly at the present time. On this account, the converter process cannot be considered in cases where no pig is available, or where it is expensive and difficult to procure.

It is often imagined that the open-hearth and electric arc process are better from the point of view of quality than the converter process. This, however, is only true for some specially high-grade steels. The majority of the steels required by the consumer can be satisfactorily produced in basic

Bessemer steel works. Until recently, however, due to the influence of the open-hearth using countries, particularly England and North America, basic Bessemer steel has been unfavorably regarded. During the past decade the steelworks of Germany and Western Europe, and more recently England, have been endeavoring to secure a uniformity of quality in basic steel and to let the higher capacity Bessemer converter relieve the comparatively low capacity open-hearth and electric arc furnace plants of the heavy demands being made on them.

To produce the grades which are essential for the open-hearth and electric arc process, the duplex process is used. The high capacity of the converter process is used to blow down the pig quicker and the open-hearth or electric arc process carries out the finishing of special high-grade steels. This process is naturally more expensive for the single melt than the single furnace process as used in England and at Witkowitz where the refining and finishing take place in one furnace or where, at the most, an active mixer is used.

All ordinary steels produced slowly and expensively by the single furnace process in the open-hearth or electric furnace, the mixed basic-electric or converter open-hearth plant can make quickly and cheaply, without secondary treatment, in the open-hearth or electric furnace, and only smaller quantities of special steel need pre-blowing in the basic works as with the duplex process, and are finally melted in the open-hearth or electric furnace. In this way the duplex eliminates the impregnation of the open-hearth furnace with phosphorus which, with single furnace practice, cannot be avoided when using large amounts of phosphoric pig iron. On account of this elimination of phosphorus impregnation the duplex process is definitely superior in quality to the single furnace when using phosphorus pig; also even with the use of pig with a low phosphorus content the quality of the steel produced by the duplex process is superior to the quality of steel produced by the pig-iron and ore process in a single furnace.

By introducing the duplex process there occurs a marked rise in the capacity of the open-hearth or electric furnace together with a drop in that of the basic plant concerned, as this, in addition to the production of finished steel, has to produce steel for the open-hearth or electric furnace. This drop in capacity can, however, be countered by increasing the efficiency of the converter.

¹⁰ Some American companies do this, as for instance Universal-Cyclops Steel Corp.—Ed.

¹¹ Rev. Métall., Mem., 30 (1933), pp. 1-10; Stahl und Eisen, 53 (1933), pp. 558-59; THE IRON AGE, Oct. 14, 1937.

¹² In the U. S. the electric steel percentage is growing but at a very slow pace, and currently averages little over 2 per cent of total steel output.

NEW ANNEALER DUBBED "TOP HAT"

A NEW design of bell-type lifting-cover furnace, which is said to provide a high degree of temperature uniformity and high temperatures without the use of electric energy, has recently been designed by Continental Industrial Engineers, Inc., Chicago. The new unit, called a "top hat" furnace, is shown in the accompanying illustration.

The top hat annealer differs from older bell-type furnaces in that a continuous radiant wall surrounds the material, there being adjustments available to control temperature and heat input at any horizontal plane. The design of burner used is such that large regulation from minimum to maximum can be obtained, the turn down exceeding 15 to 1. This latter characteristic is especially important

when the load is approaching the maximum temperature conditions.

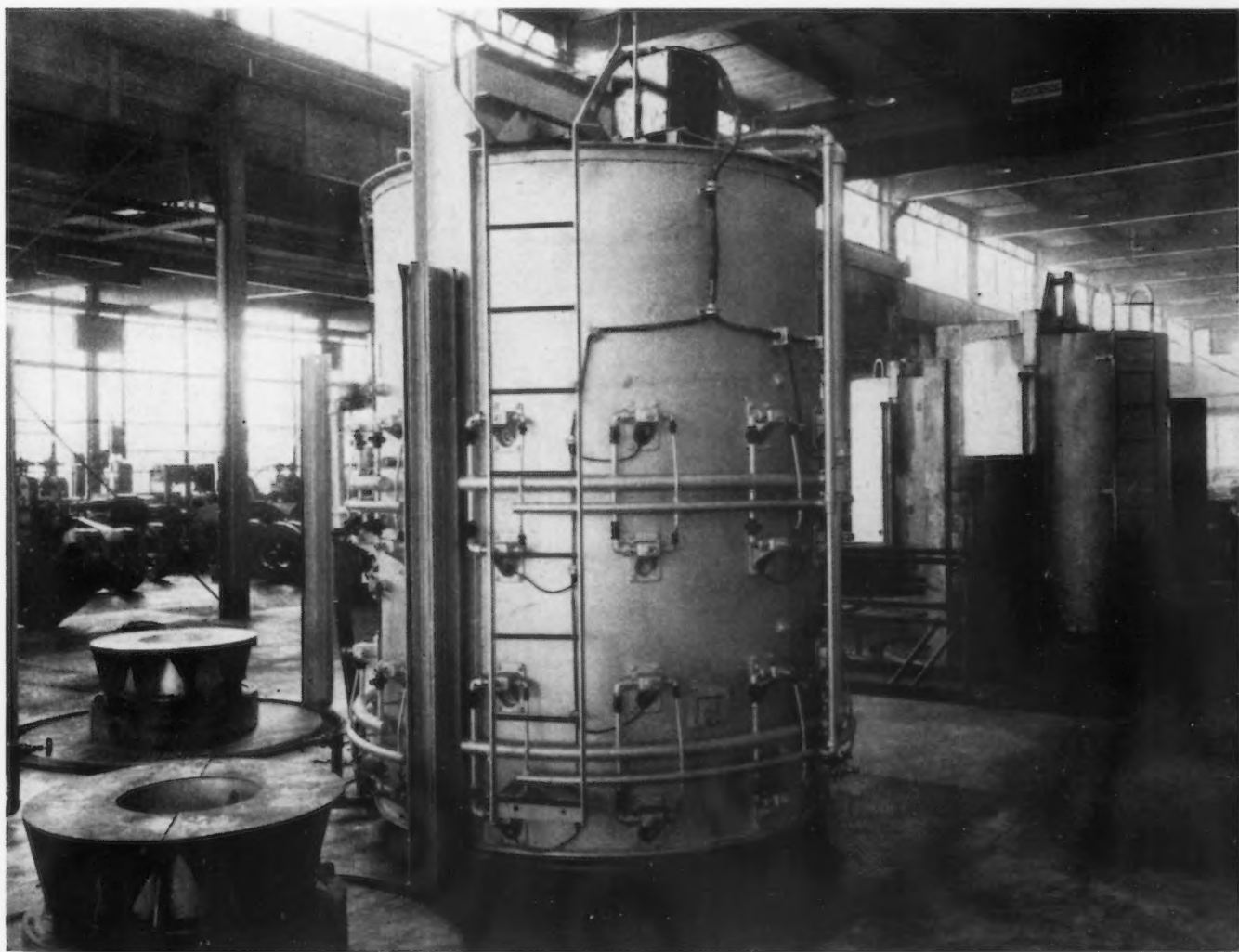
For annealing coiled strip or wire, an internal central radiant burner may be incorporated, and tests have indicated that the furnace utilizing this element operates with great temperature uniformity on a much shorter working cycle. Temperature variations of less than 5 F. deg. in all parts of the metal are readily held, according to the makers.

Simple operation is a feature of this new furnace. Starting involves merely the closing of electric plug connections and flexible gas connections. A single starter switch automatically lights all burners and the furnace is in operation. Safety devices make it practically impossible for a careless operator to neglect any item of the operation.

The builders claim that simplicity of design makes the top hat furnace unusually free from maintenance expense.

Other characteristics particularly emphasized by the builders are that the top hat furnace can be brought to temperature very rapidly and that heat distribution is very uniform.

The flexibility of the design for various annealing cycles is noteworthy. Each radiant heat ring or burner is independently controlled, so that a low carbon steel requiring a lower temperature can be annealed with greater uniformity by turning down or cutting off entirely the upper radiant heat rings. Similarly, varying sizes of loads or types of materials may each be annealed with the most effective cycle.



RECTIFIERS FOR STEEL MILL

THE newly developed ignitron rectifier is being applied for the first time to the steel industry for converting alternating current to 250 volt d.c. power for general mill auxiliaries. Unusually high efficiency, ease of installation and proven reliability in other industrial service are

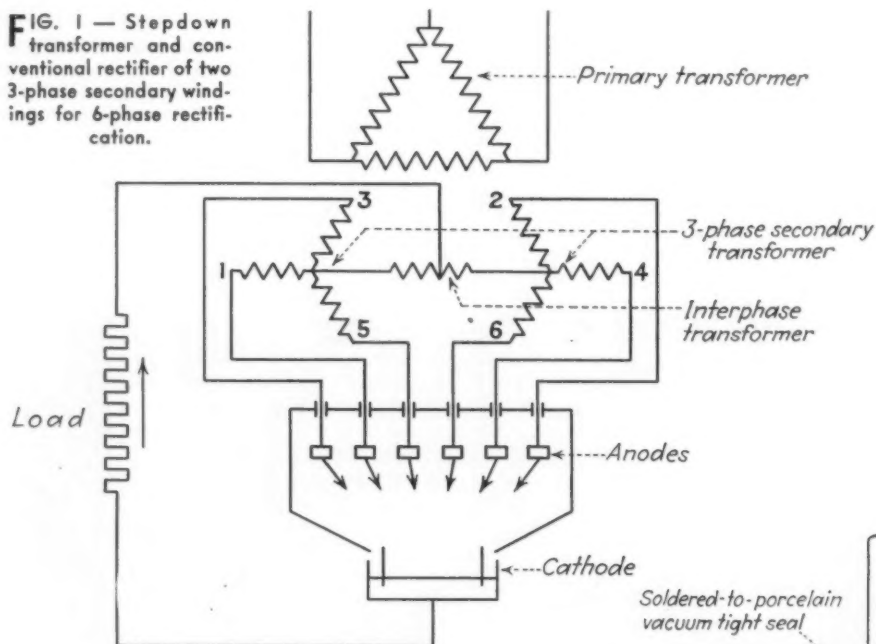
quired, and, for the present, synchronous M.G. sets are more practical for this application than rectifiers. But for 250-volt service in steel mills, the rectifier is believed to offer real advantages.

The conventional type of mercury arc rectifier has been available for a

number of years, but it has found its greatest application in other industries where a direct current voltage higher than 250 is used. This is due to the fact that the efficiency of a mercury arc rectifier suffers when it is used to supply low direct current voltages. The steel industry has been using motor generator sets and rotary converters for their d.c. supply, but with the introduction of the ignitron rectifier lower losses have been obtained, thereby substantially increasing its efficiency for 250-volt d.c. steel mill service.

A mercury arc rectifier consists of a step-down transformer, one or more metal tanks and other auxiliaries. A conventional type of rectifier usually has six graphite anodes, mounted in the top of the metal tank, which deliver current to a mercury pool in the bottom of the tank which serves as the cathode. The conducting medium between the anode and cathode is mer-

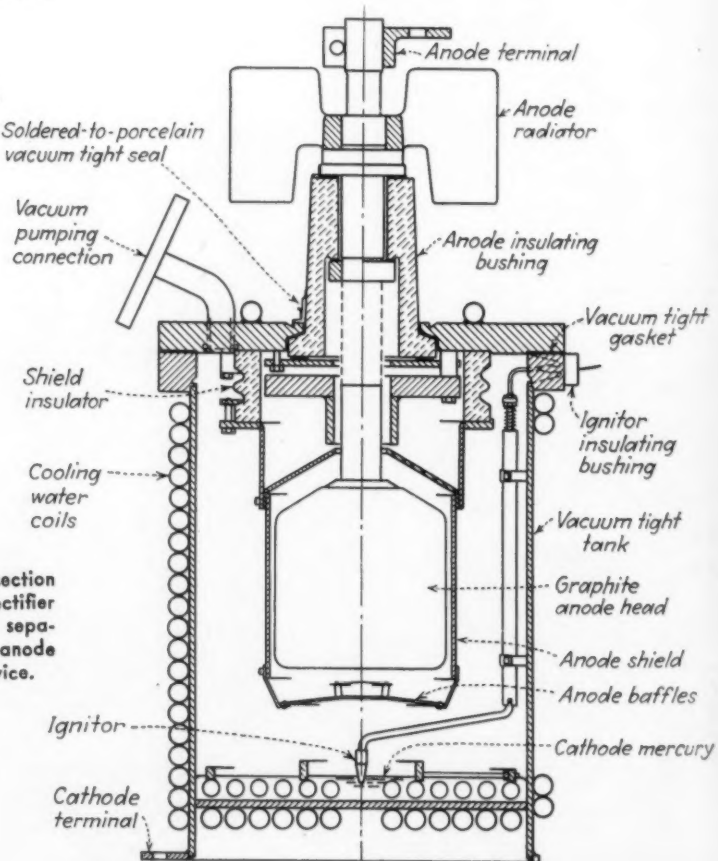
FIG. 1 — Stepdown transformer and conventional rectifier of two 3-phase secondary windings for 6-phase rectification.



among the particular advantages of the rectifier unit for steel mill power supply. Many industries are able to use constant speed continuous running motors for most of their applications, but in the steel industry a majority of the applications are of a special nature requiring the flexibility of direct current motor drives.

The steel industry often employs two direct current voltages, 600 and 250. The former is utilized in the installation of variable voltage equipment such as reversing blooming mills, or on continuous running hot and cold strip mills where 600-volt synchronous M.G. sets are used to supply the finishing mill motors on a hot strip mill and all of the motors on a cold strip mill. As yet little or no experience has been gained in the use of rectifiers for variable-voltage units where regenerative braking is re-

FIG. 2 — Cross-section of ignitron rectifier which provides a separate tank for each anode for steel mill service.



L AUXILIARIES

By G. E. STOLTZ

Westinghouse Electric & Mfg. Co.

cury vapor and this is kept ionized at all times while the rectifier is in operation. The main circuit connections for such a unit are shown in Fig. 1.

In a multi-anode tank rectifier such as this, one or more anodes carry current at the time that others are bearing negative potentials in the same tank. This means that the anodes bearing negative potential are in an ionized gas. Under these conditions, it has been found that an anode must be protected by shields and grids or it will break down in the reverse direction, or arc-back. The function of these shields and grids is to de-ionize the gas adjacent to the anode. These grids and shields restrict the arc path during the time current is flowing to the cathode, and therefore add to the loss of the rectifier.

Each Anode in Separate Tank

By placing each anode in its own individual tank with a pool of mercury at the bottom acting as a cathode, and using an ignitor to ionize the gas only during the period when the active anode is transporting current, the inactive anodes are left in de-ionized gas which greatly reduces the tendency to arc-back and which makes it possible to use a shorter path between the anode and cathode, thereby reducing the losses in the rectifier.

The construction of the ignitron unit is shown in Figs. 2 and 3. Six of these tubes are assembled in a unit. The development that made this possible is the ignitor with its operation which performs essentially the same function as that of a spark-plug on a gas engine. The ignitor is a pencil point shaped rod of high resistance that dips into the mercury pool. The arc is initiated by passing current from the ignitor into the mercury. As soon as the arc is initiated, the anode picks up current and conducts until some other anode becomes more positive. At the end of the conducting period, the arc goes out in the ignitron. Since there is no arc in the tank during the major portion of the cycle, the source of ionization is eliminated and consequently the shields and grids for de-ionizing purposes can be reduced and the anode can be located

ELECTROCHEMICAL plants, coal mines, etc., have in numerous instances turned from M.G. sets to rectifier units as a power supply. But, for the first time a steel mill has installed a rectifier unit for handling 250-volt d.c. general mill auxiliaries. Results so far have been very satisfactory, and the outlook for widespread adoption of units such as herein described is promising.

close to the cathode. This reduction of shields and grids and the relatively close separation of anode and cathode results in reduced arc drop and therefore higher efficiency.

The relative efficiency of an igni-

tron rectifier compared with that of a conventional rectifier, a synchronous converter, and a synchronous M.G. set is shown in Fig. 4, both at 600 volts d.c., and 250 volts d.c., according to data prepared by the author's company. While the conventional rectifier shown has a higher efficiency at 600 volts than either the synchronous converter or synchronous M.G. set, there is not much difference in its efficiency at 250 volts d.c. at full load when compared with the synchronous M.G. set, and except at light loads it is less than the synchronous converter. According to the data graphed, the ignitron rectifier is decidedly better than the synchronous M.G. set at the lower voltage, and is comparable with that of the synchronous converter. The improved

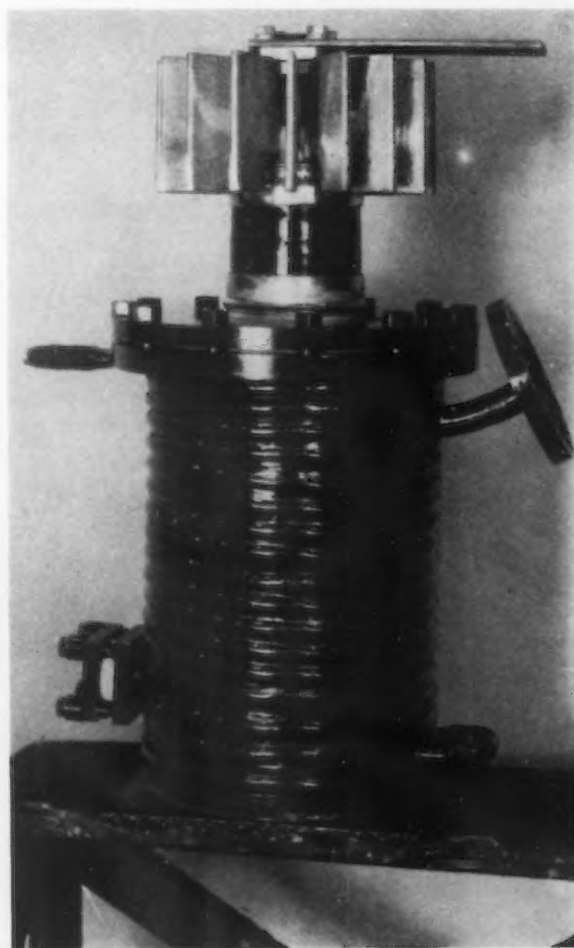
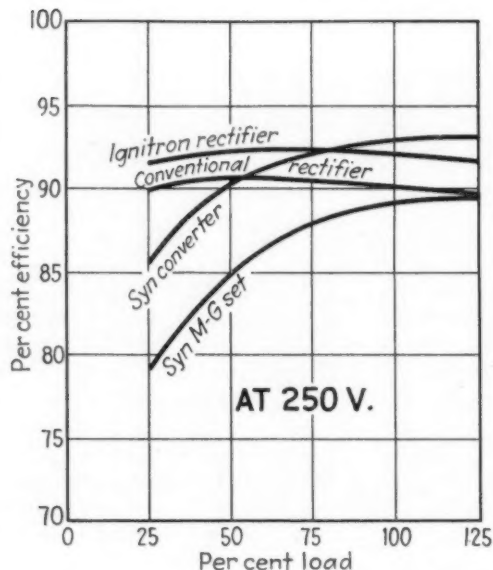
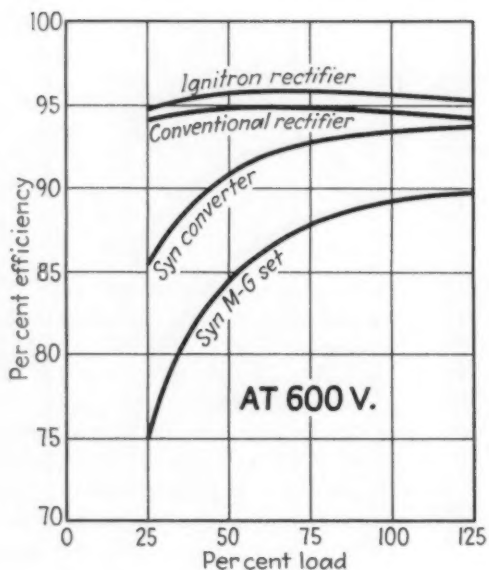


FIG. 3 — Side view of ignitron tube with a d.c. current rating of 500 amp.



AT LEFT
FIG. 4—Comparison of efficiency curves from 750 kw. capacity conversion units for steel mill service.

BELOW
FIG. 5—A 300 kw. 275 volt ignitron rectifier installed in a Pittsburgh coal mine.

efficiency of an ignitron rectifier over that of a conventional rectifier makes it more of a factor at 250 volts d.c.

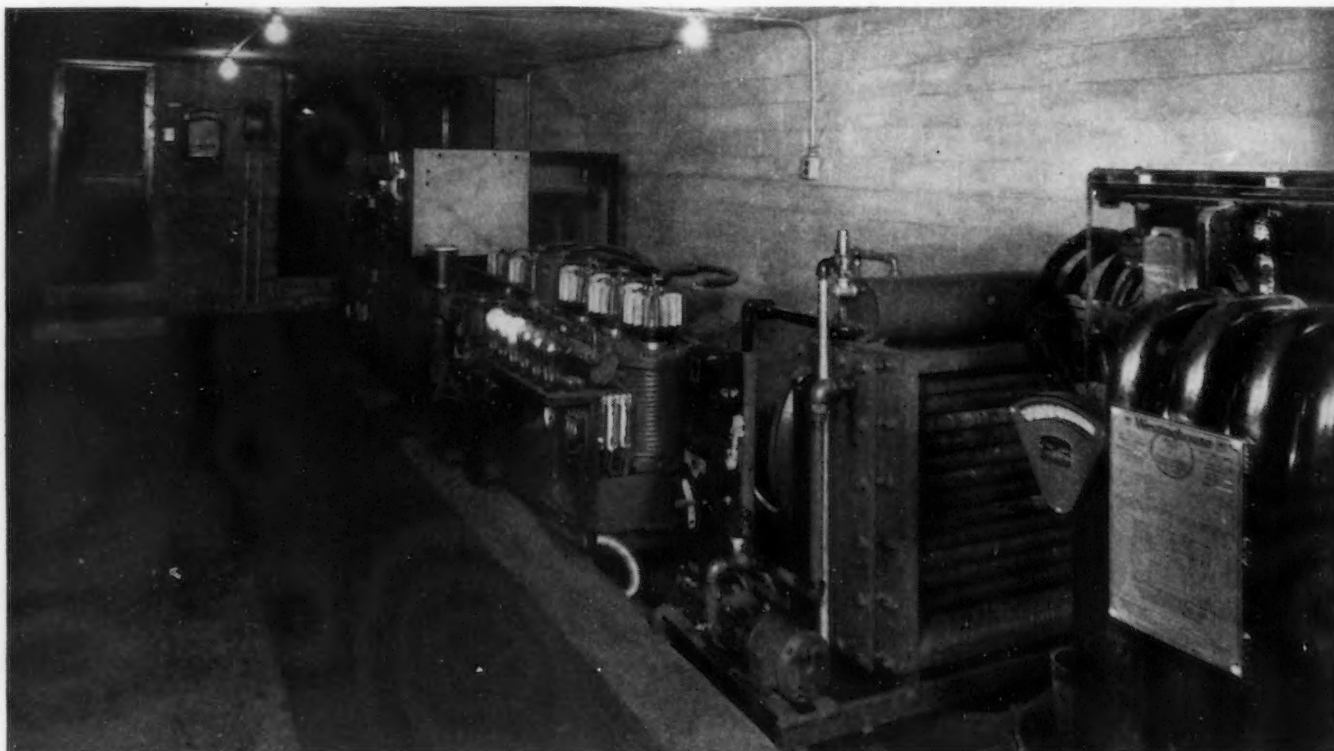
The importance of continuity of service in the steel industry requires that it take a very conservative attitude toward the introduction of new developments. Quite often it is desirable to get first hand operating experience in other industries than steel. While the ignitron rectifier has only been available for three years, a number of 250-volt class installations have been made in the mining and electrochemical industries, which represent severe operating conditions.

Recent Installations

In the mining industry, which imposes severe duty, they are particularly attractive due to their light weight, which easily adapts them to portable sub-stations, and the low maintenance and infrequent attention required permit installation in isolated places. In February, 1937, the 300 kw. 275 volt d.c. 2300-volt, 3 phase, 60 cycle ignitron mercury arc rectifier in Fig. 5 was installed in a mine near Pittsburgh. This rectifier is approximately two miles from the mine shaft, and it is kept on the line continuously. Other converting equipment of a rotating

type is shut down during light load periods. The transformer is Inerteen-filled and a water-to-air heat exchanger is used for cooling the rectifier. The unit is started and stopped by pushbutton control and is inspected at regular intervals by an electrical attendant. Similarly, another Pennsylvania mine installed three portable ignitron units having ratings of 300 kw. 275 volts d.c.

One of the most severe applications for commutating machinery is found in the electrochemical field. Here the load is maintained continuously at full capacity, not giving the commutator



time to polish during light load periods. In recent years rectifiers have been very largely used on new installations in the electro chemical field due to their ability to carry heavy loads continuously with no increase in maintenance. A large electrochemical company has in operation the 1350 kw. 280 volt ignitron rectifier shown in Fig. 6. The rectifier units are installed on the upper balcony immediately above the transformer and control equipment.

The railway industry was one of the earliest to adopt rectifiers, their voltages always being in the neighborhood of 600 volts d.c. or greater. In addition to low maintenance, the rectifier at this higher voltage has considerable margin over rotating machinery in regard to efficiency. A 3000 kw. 640 volt ignitron type of rectifier recently was installed for main line service and to date it has given excellent service.

As described, the mercury arc rectifier has proved itself by considerable field experience in other industries. With the initial application of the ignitron rectifier in the steel industry an accomplished fact, executives and engineers of metal working plants are increasingly aware of this new development as a possible means of aiding operating efficiency.

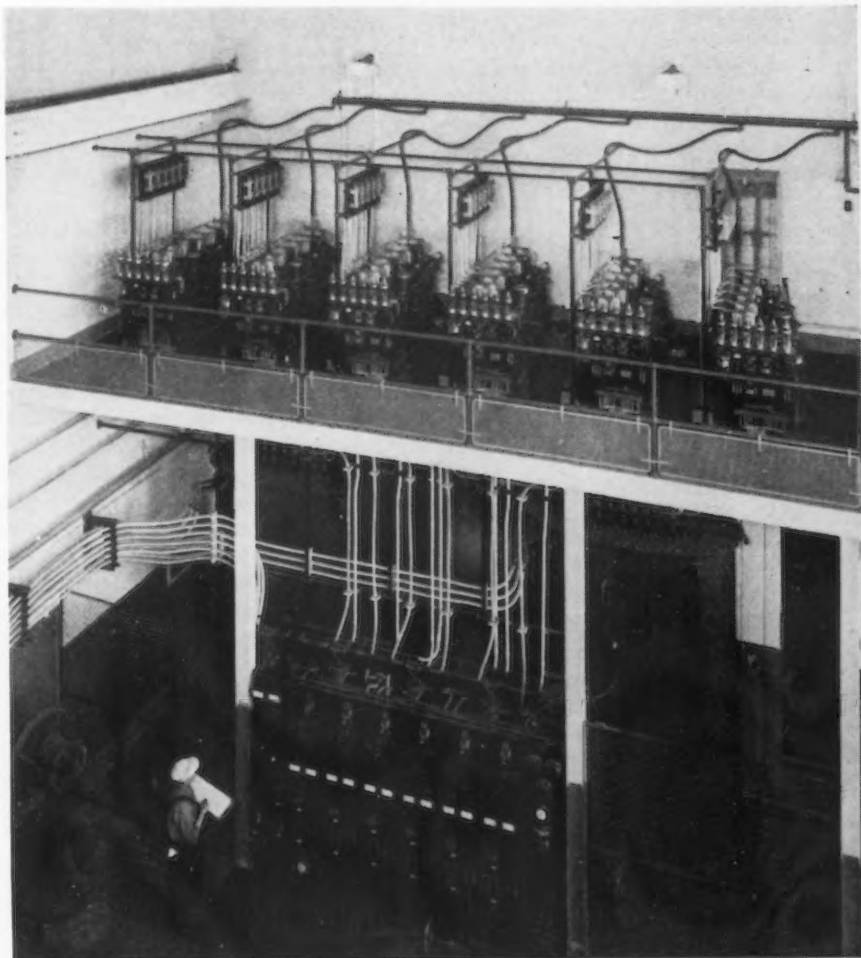


FIG. 6—A 1350 kw. 280 volt ignitron rectifier in electrochemical service.

Du Pont Announces Moly-Black Electroplate

A NEW black plating process has been announced by E. I. du Pont de Nemours & Co. It is described as producing lustrous, deep black electrodeposits sufficiently black to escape color refraction under an intense beam of light in a dark room. It is based on a combination of molybdenum and nickel, available in plating salt form. The process operates at a high rate of deposition at low current densities, 20 times more rapidly than nickel under identical conditions. Its throwing power is said to be higher than any other plating system, giving deposits of uniform thickness even in deep irregular recesses.

Du Pont chemists point out that the development is scientifically significant

in that it raises new questions on the nature of plating processes. Analysis of the deposit shows it to contain 45 per cent molybdenum and 10 per cent nickel, the balance being chiefly oxygen.

Projected uses cover a wide range, among them electrical accessories, instrument dials, office furniture, lighting fixtures, flashlight cases, automotive hardware and trim, hinges, furniture hardware, and stoves. An important application is seen in optical instruments such as microscopes, cameras, and telescopes, where a true black finish is necessary. It is applicable to bases of zinc; aluminum; cadmium electroplated on brass, iron,

or steel; tin, either electroplated or hot-dipped; nickel; and steel or iron. An unusual characteristic of the new black process is its ability to plate directly over aluminum prepared only by cleaning in an alkaline bath.

The coating works well over any of the suggested base metals, particularly as a decorative finish for indoor use. For outdoor use, the black plate should be deposited over an undercoating of cadmium, after which it should be lacquered. Deposits produced by the new process are of low density, with a maximum thickness of about 0.002 in.

Du Pont has designated the process as the Moly-Black molybdenum-nickel electroplating process.

THIS paper (herein slightly abridged) is one of a series of practical dissertations on the manufacture of mild steel rimming ingots, specifically by the acid Bessemer process in this instance, appearing in the recent report No. 27 of the Iron and Steel Institute (British). An even more detailed description of this operation at the Workington plant was presented recently by the authors in a preprint of the Institute of Marine Engineers, March 14, 1939.

The Bessemer department at Workington is situated adjacent to the blast furnaces, and the molten pig iron is brought direct from the blast furnaces in 50-ton ladles and poured into a 400-ton mixer. The Bessemer shop proper uses two 25-ton converters equipped with the necessary casting pits and auxiliary handling equipment.

The process as is well known, consists essentially of blowing air through a molten charge of iron until the carbon, manganese and silicon are removed, followed by the suitable addition of manganese and carbon in the form of spiegel and/or ferromanganese to achieve the desired composition. The products of oxidation during the early part of the blow give rise to a slag which is a refractory silicate of iron and manganese and which is not normally sufficiently fluid to play an active part in the process. In this respect the acid Bessemer process contrasts sharply with the open-hearth process. As will be explained later, a "wet" slag causes some difficulty.

It is not necessary herein to describe in detail the actual process of blowing. It is sufficient to state that the oxidation of silicon and manganese in the early stages of the blow provides the necessary heat, and that as the carbon begins to oxidize, the flame emerging from the mouth of the converter lengthens and brightens, until finally it is some 25 ft. long and of intense brilliance. At the end of the blow, the reduction in carbon content is marked by a shortening of the flame, accompanied by an increase in the fume due to the oxidation of the iron, this being the signal that the blow is completed, and the converter is turned down to the horizontal position.

A word may be added about the possibilities of using certain instruments to assist in controlling particularly the end-point of the blow. All those engaged in the production of acid Bessemer steel have, from time to time, used the spectroscopic, but the

¹Iron and Steel Institute (British), 1932, Special Report No. 2.

Acid Bessemer

application has not been sufficiently successful to warrant a continuance of its use. Recently, it has been announced that the photocell has been applied with some success in America. The authors have used the photocell for some considerable time, the apparatus being designed and applied by A. G. Hock, metallurgist to the Workington Iron & Steel Co., Ltd. In so far as the photocell can be used to measure the luminosity of the flame, it is, of course, successful, but the speed of reaction does not exceed that of the human eye and, so far as the application for this purpose is concerned, the true value to the Bessemer blower is questionable.

The Bessemer process has been criticized because of the dependence upon the human element in judging the end of the blow, and it is felt that such critics would be duly impressed if some equipment such as spectrometers, photocells, etc., formed part of the apparatus used by the Bessemer blower. As a matter of practical fact, the judgment of the end of the blow is a comparatively easy matter. The skill of the Bessemer blower is to be judged more by his ability to observe the earlier features of the blow and to anticipate the characteristics of the metal, particularly the heat developed, at as early a stage as possible. It is to this end that Mr. Hock is still pursuing his work, and in this direction

the application of modern scientific equipment is likely to be most helpful. For a fuller treatment of the process, the reader is referred to the authors' previous paper.

In the accompanying figure are presented curves plotted from a series of data representing the changes in composition during the period of the blow, which may be taken as typical in making a cast of mild rimming-quality steel.

The procedure of blowing is essentially the same for all qualities, although suitable control of the mixer-metal analysis is important, as referred to later, and the additions of finishing alloys are worked out to give the correct carbon, manganese and silicon contents, together with such special additions as may be specified.

An examination of the accompanying graphs will show that the silicon and manganese are reduced to very low values while the carbon is still in the region of 2.5 per cent, after which the latter falls steeply to a value of about 0.05 per cent at the end of the blow. The sulphur and phosphorus contents are virtually unchanged. In some circumstances there may be a slight reduction in the sulphur, while the phosphorus is usually slightly increased, owing to concentration.

The data concerning the gas content

Series of Mild Steels Made by Various Processes, Giving Total Oxygen and Nitrogen Values

Identification Letter	Method of Manufacture	Type of Steel	Analysis, Per Cent					Oxygen, Per Cent	Nitrogen, Per Cent
			C	Mn	Si	S	P		
A	Acid bessemer	Solid	0.16	0.59	0.06	0.038	0.035	0.015	0.011
G	Acid bessemer	Solid	0.12	0.48	0.055	0.046	0.040	0.031	0.011
B	Acid bessemer	Rimming	0.09	0.37	trace	0.040	0.033	0.018	0.011
H	Acid bessemer	Rimming	0.12	0.44	trace	0.047	0.048	0.014	0.011
D	Basic open-hearth	Solid	0.11	0.42	0.085	0.031	0.017	0.032	0.006
K	Basic open-hearth	Solid	0.16	0.53	0.20	0.030	0.022	0.031	0.006
M	Basic open-hearth	Rimming	0.135	0.47	trace	0.050	0.022	0.019	0.004
C	Acid open-hearth	Solid	0.10	0.47	0.11	0.029	0.026	0.026	0.004
L	Acid open-hearth	Solid	0.12	0.53	0.095	0.034	0.037	0.017	0.006

Carbon, manganese, silicon, per cent

Rimming Steel

By T. SWINDEN and F. B. CAWLEY,
United Steel Companies, Ltd., England

o o o

during the course of the blow are, the authors believe, novel, and present some very interesting features. It will be seen that nitrogen increases during the course of the blow, the rate of increase being accelerated as the carbon is eliminated. It remains at a value commonly in the region of 0.010 to 0.016 per cent in the finished steel.

Values for hydrogen as extracted in the vacuum fusion method are also reported. No doubts exist as to the accuracy of the method, but as it is known that the hydrogen content is affected with the passing of time even at atmospheric temperature, it is necessary to be reticent in interpreting the actual values. It is clear, however, that the hydrogen content is reduced during blowing and the finished steel is definitely lower in hydrogen than the original mixer metal from which it is made.

The authors wish to direct particular attention to the oxygen content. The values reported are those obtained by the total vacuum fusion method. Here it will be seen that the oxygen content of the original iron is extremely low. It increases compara-

tively slowly until the carbon is reduced to about 1 per cent after which it increases rapidly, reaching a high value in the blown metal. It is particularly to be noted, however, that the oxide content of the finished steel, even in the case of a full rimming steel, is comparatively low.

The question may be asked as to what the oxygen content would be if the steel were seriously over-blown. Unfortunately the authors have no actual oxygen determinations, but attention is directed to an experiment designed to investigate this point, which was dealt with in the fourth report of the Ingots Committee published in 1932.¹ In this, two ingots, examples 49 and 50, were cast from steel made in a side-blown acid-lined converter. In both heats precisely similar cupola metal was charged, but in the case of example 49 the blowing was extended a further 40 sec. after the normal drop of the flame, and the resultant state of oxidation of the metal may be judged from the active fiery slag having an FeO content of 33 per cent as against about 20 per cent for the normal cast. The sulphur print and macro-etch of ingot No. 49 were excellent and the report concludes: "It is shown that, by the methods of investigation employed, the cast of over-blown steel compares favorably as regards inclusions with ingots produced by the more generally

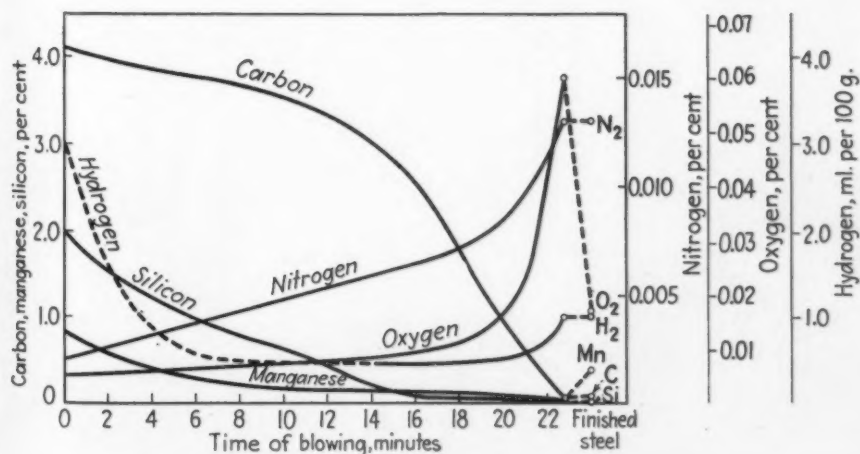
accepted methods of producing clean steel."

The Bessemer process affords peculiar advantages in the manufacture of rimming steel. The reduction of carbon to very low limits is easy compared with the open-hearth process, and the necessary degree of oxidation can be well controlled. There are naturally, however, certain points that require careful attention in the consistent production of first-quality rimming-steel ingots. In the authors' views, the most important is the composition of the hot metal, with particular reference to the manganese content or, to be more specific, to the silicon-manganese ratio. As a rough guide, it may be said that the manganese content should not exceed one-half that of the silicon content. Thus, 2.0 per cent of silicon with 0.75 per cent of manganese is very satisfactory in the authors' practice.

It has already been explained that the normal Bessemer slag is highly refractory and, in fact, remains in the converter when the steel is poured into the ladle. If the manganese of the mixer metal is too high, a liquid slag is formed in the vessel. All manufacturers of acid Bessemer steel know that a "wet" slag is to be avoided. When such a slag is formed, it enters the ladle with the steel. The slag is acid in character and the result of this "slag" treatment of the blown metal definitely tends to convert what would be a normal rimming ingot with 2-in. to 3-in. rise, into a *rising* ingot, with consequent serious adverse effects on the structure of the ingot. Features other than high manganese which produce a "wet" slag have the same effect. Moreover, with a high-manganese iron the tendency is to under-blow and produce a steel which is insufficiently oxidized to give good rimming properties. General practice is to control the blowing so that the desired rimming effect is obtained consistently with a small addition of aluminum to the mold of the order of 1 to 1½ oz. per ton.

As regards the general characteristics of mild steel of the rimming type produced by the acid Bessemer process, it can be said broadly that it possesses all the usual characteristics of similar steel produced by other processes. It reacts in precisely the same way to up-hill *versus* down-hill casting (up-hill providing a greater margin of safety in producing satisfactory ingots) and to the various known methods of controlling the amount of the rise. Temperature con-

(CONTINUED ON PAGE 91)



Changes in composition during a blow of acid Bessemer steel

FURTHER DEVELOPMENTS IN

ANNOUNCEMENTS continue to come from the manufacturers of machine tools that were intended to be shown for the first time at the Machine Tool Show at Cleveland. The machines described and illustrated in these pages are in addition to those highlighted in the Sept. 28 "Show in Print" issue or illustrated in connection with regional shows described in the Nov. 2 issue.

• • •

MULTI-POSITION electric pendant, directional control for spindle rotation and traverse of all sliding units including Hi-Lo dual control at the head and bed level for shifting gears in the speed and milling feed change gear boxes is the outstanding feature of the new

5-in. horizontal boring mill, made in 48 and 60 in. bed widths by the *Lucas Machine Tool Co.*, Cleveland. Another innovation is the location of the speed and milling feed change gear box on the bed instead of in the head, thereby eliminating the need of counterbalancing the head and leaving room in the head for final spindle driving gears of unusually large diameter for the slow speed drives; for high speed, drive is direct by V-belts to the spindle.

Spindle has 60 in. continuous traverse, by means of a lead screw, if so ordered specially, making the unit adaptable for thread cutting. Spindle feeds are taken off the spindle sleeve; hence the rate per revolution is not affected by any change in spindle speeds. A large graduated dial on the front of the head indicates directly the distance the spindle extends beyond the faceplate, serving as a depth gage for the full spindle travel.

All motions have power rapid tra-

verse as well as feed, and the table is provided with jump feed crosswise with the aid of adjustable dogs, thereby expediting the milling of pads and the like. Provision for pre-selection of traverse also facilitates milling around rectangular edges by instantly shifting from table cross to head vertical feed and vice versa.

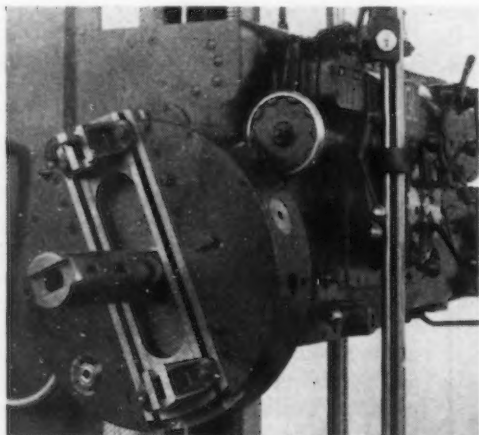
The backrests of these large machines are heavy and are traversed by individual motor under directional push button control. The backrest block itself is clamped in position by means of a torque motor automatically operated by remote control simultaneously with the head clamps, which are interlocked with the vertical feed. Likewise, the saddle clamps are interlocked with the power motion.

Facing Attachment

ACONTINUOUS feed facing head, adaptable to practically all its existing machines, has been added

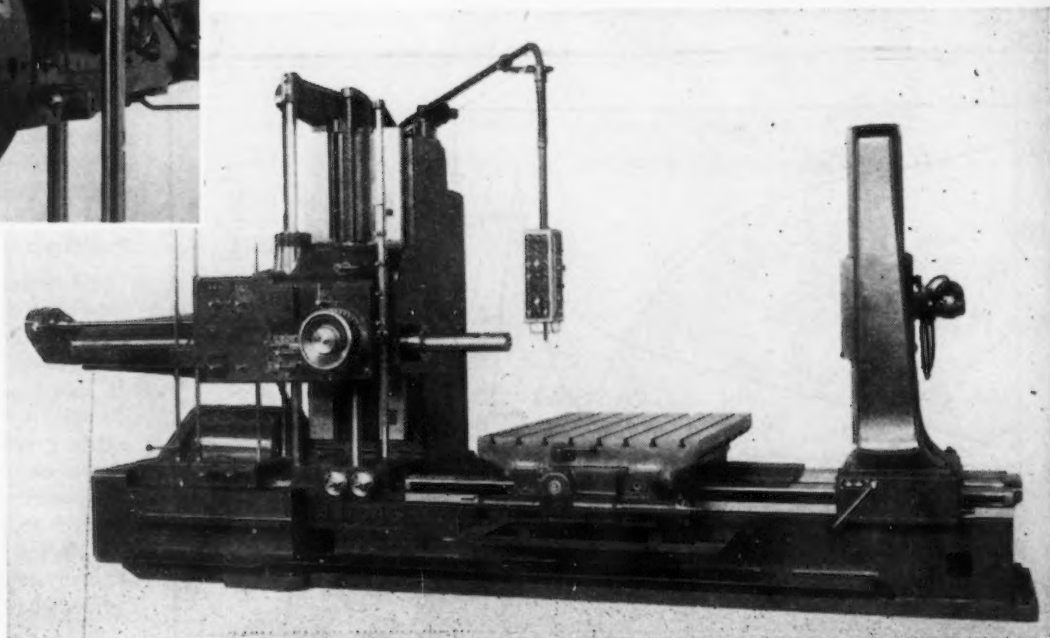
• • •
BELOW

MULTI-POSITION, electric pendant, directional control is featured in the new Nos. 548 and 560 5-in. Lucas horizontal boring, drilling and milling machine, furnished in bed widths of 48 and 60 in. The 48 in. wide bed is shown.



ABOVE

NEW continuous feed facing head applicable to Giddings & Lewis horizontal boring machines. Such operations as counterboring, boring of large diameter holes, turning and grooving flanges, recessing and countersinking are also possible with this auxiliary head, besides facing.



MACHINE TOOLS

By FRANK J. OLIVER
Associate Editor, *The Iron Age*

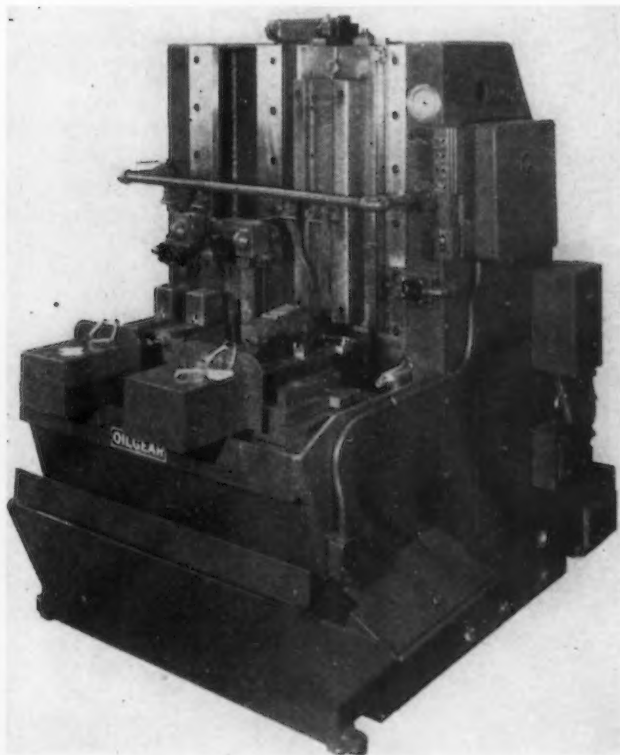
to the line of horizontal boring, drilling and milling machines made by the *Giddings & Lewis Machine Tool Co.*, Fond du Lac, Wis. The auxiliary head is attached to the spindle sleeve and is provided with a bushing through which the main spindle can slide freely, making it possible to perform facing and boring operations simultaneously. The facing feed can be had at six rates from 0.006 to 0.125 in. per rev., engagement and direction of the feed being by a lever. When the power feed is disengaged, the head may also be used as a large offset head for single point boring operations, and

a micrometer dial is provided for adjustment when the head is so used.

Double Slide Broaching Machine

FIVE sizes of new type XD double slide vertical surface broaching machines varying in normal capacity

from 3 to 25 tons and broaching strokes from 30 to 66 in. are now being offered as standard equipment by the *Oilgear Co.*, 1314A W. Bruce Street, Milwaukee. Outstanding features of these new machines are: dual



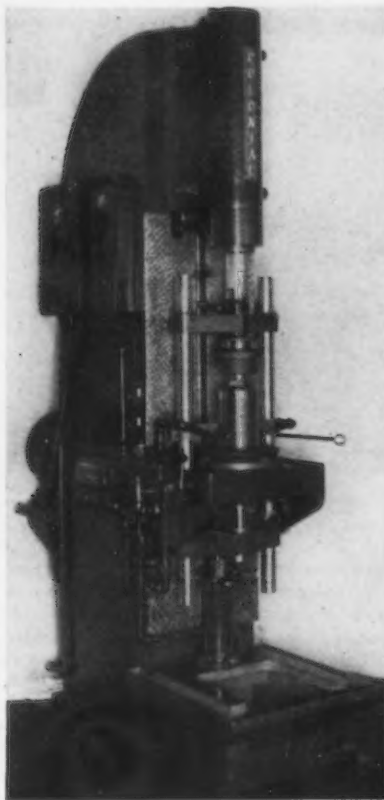
ABOVE

OILGEAR type XD 10 x 30-in. stroke, double slide vertical surface broaching machine with tools and fixtures for work on rifle parts. A 15/32 x 2 3/4 in. surface and two angular surfaces 15/32 x 3/4 in. are finished on two parts per stroke on the right hand slide at the rate of 460 pieces per hr., while four side surfaces 3/8 x 3/4 are finished by the left-hand head. Clamping and unclamping of parts is fully automatic.

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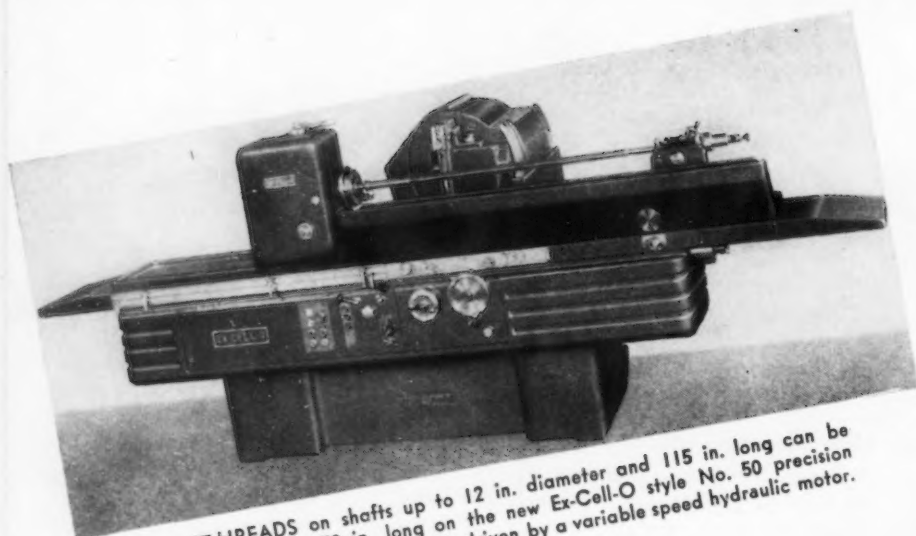
BELOW

INTERNAL bores of tractor ring gears are being broached on this Colonial 10-ton openside press with the aid of a suitable fixture mounted on a vertically movable table. The broach itself is approximately 15 in. long, 7 1/2 in. in diameter and is built up from a number of individual rings, the lower ones being provided with chip breakers. It is guided at top and bottom throughout the stroke and is released by the ram at the bottom of the work stroke. After removal of the part, an automatic broach handler raises the broach into the puller before the ram returns to the top. Operation is hydraulic throughout.

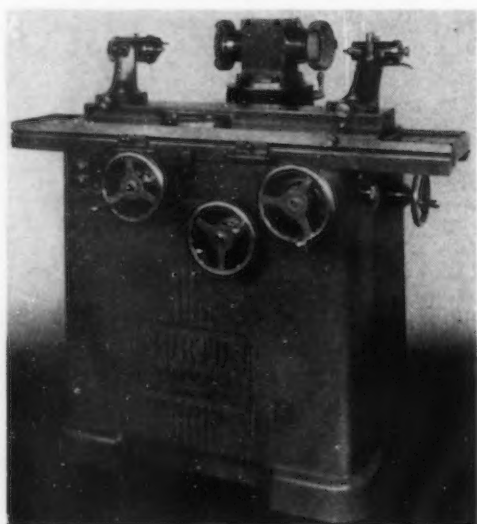


ABOVE

THE Redin No. 0 sensitive drill, previously described on p. 43 of the Dec. 8, 1938, issue, is now available in the floor type model shown. Capacity is for drilling holes up to 5/16 in. diameter. Drive is by a 1/2-hp. motor through a rolling wedge four-speed transmission, giving spindle speeds from 900 to 5000 r.p.m. A No. 30 Jacobs chuck is supplied as standard equipment. Distance from spindle to column is 6 1/2 in. and the maximum distance from spindle nose to table is 20 in. This machine is a product of the *Crescent Mfg. Co.*, 1104 Tenth Street, Rockford, Ill.

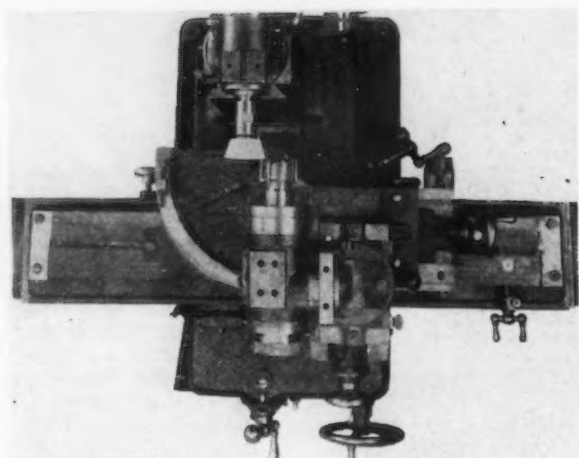


THREADS on shafts up to 12 in. diameter and 115 in. long can be cut up to 50 in. long on the new Ex-Cell-O style No. 50 precision thread grinder. Work head is driven by a variable speed hydraulic motor.



AT LEFT

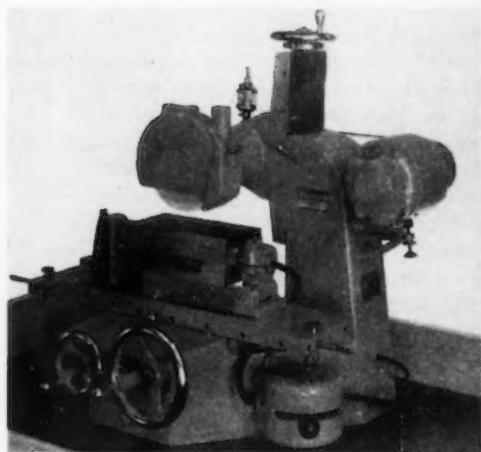
AUXILIARY handwheels on both sides make it possible for the operator to actuate the wheelslide from either side or front of the new No. 2 Norton cutter and tool grinder.



TOP view of large radius grinding attachment for use on the No. 91-A universal cutter and tool grinder made by the Covell Mfg. Co., Benton Harbor, Mich.; also for general application to tool grinders. Capacity is for face mills from 2 to 14 in. diameter and end mills from $\frac{3}{8}$ to 2 in. diameter. Cutter is located in ball bearing spindle of top part of attachment and is lined up by a special gage so that the center of the radius corresponds with the center of the pivot point. In grinding the 90-deg. radius on the corner of cutter teeth, there are adjustable stops provided which limit the swinging motion of the attachment.

BELOW

TYPE S-1 bench style utility surface grinder made by the Bergram Mechanical Engineering Co., Inc., New Britain, Conn. Work surface of the indexing electromagnetic chuck shown is 4 x 8 in. A permanent magnetic type can be furnished with 5 x 10 in. surface. Table travel is 11 in. and vertical movement of the wheelhead is 6 in., with graduated dial for fine feed. Spindle is mounted on precision ball bearings, carries a 6 x $\frac{1}{2}$ in. wheel and is driven by a $\frac{1}{4}$ -hp. motor and V-belt.



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o o o

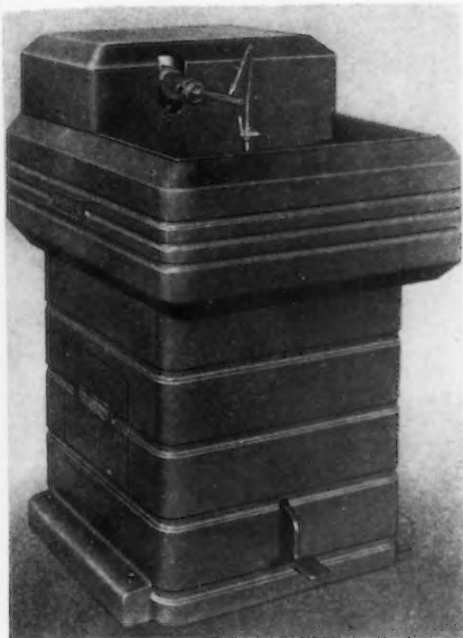
AT LEFT

MODEL 10WG combination wet and dry grinder has been designed by the United States Electrical Tool Co. for heavy duty continuous production in tool manufacture or reconditioning.

o o o

TRUING and dressing grinding wheels or points on the Stanley contour grinder can be done quickly with the new No. 155 diamond wheel dressing fixture. A ring on the bottom of the dresser fits in a counter-bored hole on the table top. The holder in which the diamond is mounted is adjustable and dressing is accomplished by moving the holder up and down on a square post. There is also provision for squaring up the fixture with the axis of the spindle.





RIGHT

NEW Michigan No. 994 horizontal two lap, crossed-axes automatic gear lapper. Work may be oscillated at rates up to 300 strokes per min. and electric controls provide lapping cycle adjustment from 2 sec. to 20 min. A vertical type machine is also made.

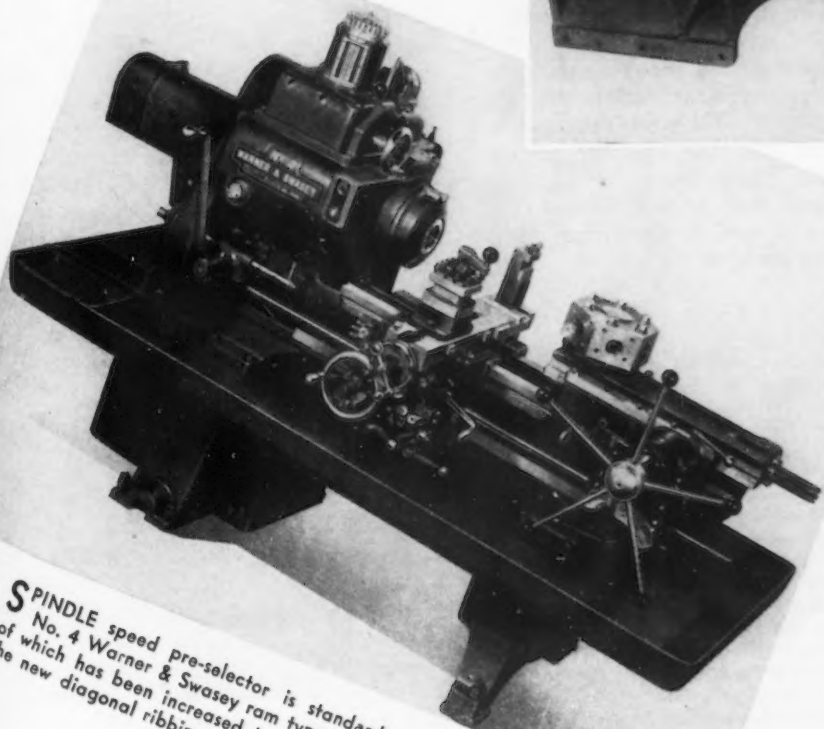
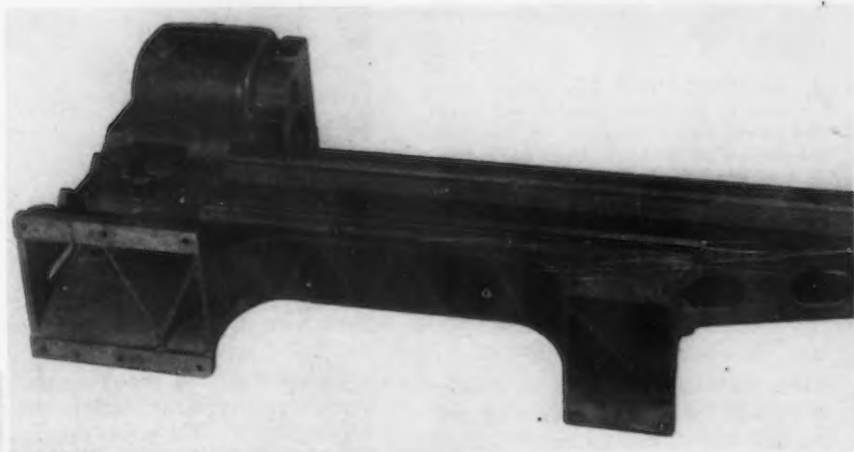
o o o

BELOW

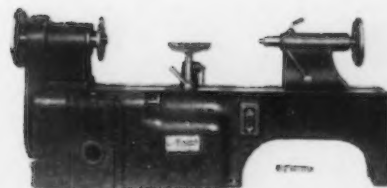
DIAGONAL ribbing similar to bridge girder design, instead of conventional box type ribbing, is now standard construction on all but the smallest turret lathes made by the Warner & Swasey Co., Cleveland. In addition, all stiffening ribs and sections are on the outside walls of the bed, making it easier for chips to fall through the openings. The whole design adds rigidity to the unit, particularly around the headstock, without however adding any weight to the casting.



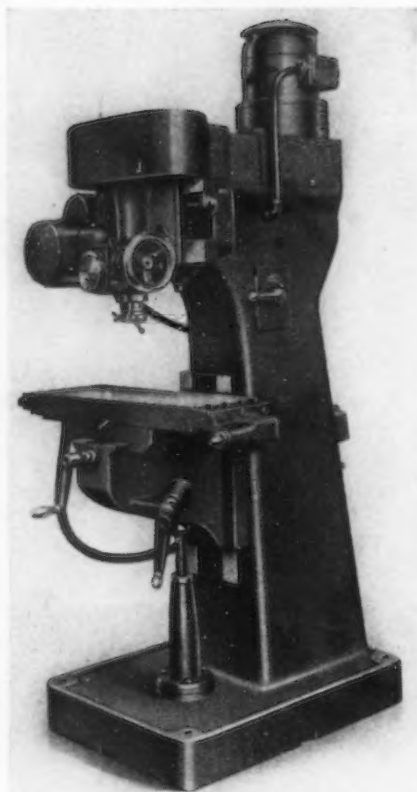
HOLES from 1/4 to 1 in. diameter and interrupted by keyways, milled or cored slots, cross holes, etc., can be quickly and accurately lapped in this new internal lapping machine, introduced by the Ex-Cell-O Corp. Features claimed for the machine include: high rate of output; long lapping stone life; ease of adjustment for size of hole, and ready interchangeability from one size hole to another. Lapping stones are of unique design and can be expanded at any place in the hole.



SPINDLE speed pre-selector is standard equipment on the new No. 4 Warner & Swasey ram type turret lathe, the bar capacity of which has been increased to 2 in. Other improvements include the new diagonal ribbing, a head brake and force feed lubrication to the head.



SPINDLE speeds from 0 to 2400 r.p.m. in infinite steps can be had in a new line of Monarch wood turning lathes with variable speed transmission, made by the American Saw Mill Machinery Co., Hackettstown, N. J. The spindle is driven by V-belt from the transmission unit and the speed is controlled by a knurled knob. This is believed to be the first application of such a drive to a wood working lathe. Headstock spindle is mounted in preloaded ball bearings. These lathes, which were originally developed for manual training work, are available in either floor or bench models. The latter, model No. MT-A, is shown.



A RECIPROCATING longitudinal movement to the spindle head as well as vertical power feed distinguish this Reed-Prentice keyseating machine from an ordinary hand feed vertical miller.

safety push button control with selector switch for manual, semi-automatic or full automatic operation; convenient knee bar for emergency stop; ample surfaces on shuttle tables and tool slides for mounting a multiple of fixtures and tools; rectangular hardened and ground ways for shuttle tables and tool slides, with automatic pressure lubrication; hydraulically and mechanically operated shuttle tables with positive interlock with tool slides; micrometer type positive stops for precise positioning of shuttle tables; and tool slide rams in tension when broaching. Each size of machine is equipped with an Oilgear type DX two-way variable displacement heavy duty radial piston fluid power pump arranged for direct drive and capable of providing independent variable broaching speed up to 37 ft. per min. for each slide.

OILGEAR is also offering three sizes of the new type XM vertical Cyclematic broaching machine in capacities of 15 to 37½ tons and in 54

and 66 in. strokes. In this type of machine, the tools are lowered by the upper ram and threaded through the work into pullers below the slide. The tools, however, then remain stationary and the work table is moved upward while cutting lubricant floods the work, causing the chips to quickly fall away from the tool and part. As the work clears the end of the tools, a mechanical ejector moves the work from fixture. Location of the tool handling cylinder for various lengths of tools is by a vertical screw actuated by a pilot motor controlled by push button.

Still another new style of Oilgear broaching machine is the type XP vertical pull down, made in five sizes



THE new Moto Miter Box is an all purpose woodworking tool recently developed by De Walt Products Corp., 2277 Fountain Avenue, Lancaster, Pa. It cuts off 2-in. stock. Direct drive motor runs from a standard light socket. Arbor can be placed in any position for all sawing operations and arm swings 360 deg. for miters; yoke and motor also swivel 360 deg. for all angle cuts. Roller bearing carriage inside arm facilitates fast work.

from 5 to 37½ tons. In these units, the tools are threaded through the work and the main slide then pulls the broaches through the work in the conventional way. The puller operation is automatic, and the operator merely loads and unloads the work. As in all the Oilgear line, all steel welded construction is used in the frame, base, table and platform.

THIS unusual marking machine, made by Noble & Westbrook Mfg. Co., East Hartford, Conn., was designed to mark inscriptions on the sides of piston rings ranging up to about 5 in. diameter. Due to the fact that the rings are machined very accurately and are quite delicate, it is necessary to mark them with a light uniform impression. The rings are carried to the marking die on a revolving dial and are unloaded automatically into a chute after being marked. A burnishing roll is provided to roll down any burr that might be formed by the marking tool. The machine can be operated at any speed at which the operator can continually feed rings on to the dial (about 75 per min. for small rings).



Thread Grinder

FOR grinding lead, feed and adjusting screws up to 12 in. diameter and 50 in. long on work up to 115 in. between centers, *Ex-Cell-O Corp.*, 1210 Oakman Boulevard, Detroit, has introduced a new style No. 50 precision thread grinder, hydraulically operated and controlled, similar to the No. 35 machine introduced in 1935. An infinitely variable range of work speed is provided by a hydraulic motor. Work table movement and work speed changes are adjusted by controls that are conveniently located at the front of the machine.

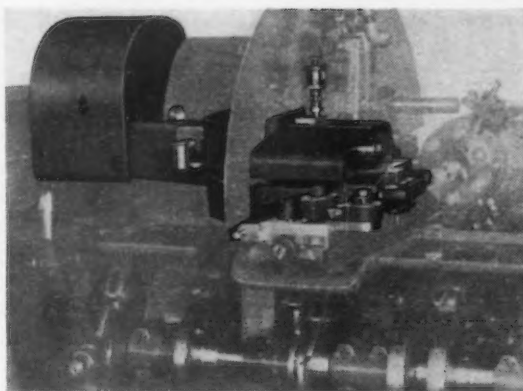
Automatic features of the machine

include: automatic grinding wheel in-feed to compensate for the amount dressed off the wheel; automatic wheel dressing device, used at grinding speed to insure rapid and accurate truing under operating conditions; and automatic backlash compensator, for grinding in both directions. Work can be reversed while the grinding wheel is in the thread cut; it is unnecessary to

have an undercut or to run the wheel off the work.

ANOTHER new *Ex-Cell-O* product is the style No. 33 external precision thread grinder for grinding threaded sections up to 6 in. diameter and 8 in. long on work up to 18 in. between centers. An attachment provides for cutting tapers up to 3 in. per ft. The grinder is electrically operated and controlled and uses 18-in. wheels running in oil coolant. It grinds continuous and multiple right and left-hand threads from 1 to 80 threads per inch. Either a plain or a

BROWN & Sharpe is now supplying thread chasing attachments for use on the B & S Nos. 00, 00G, O, OG, 2 and 2G automatic screw machines (high speed) when it is desired to produce threads particularly accurate in form, lead and pitch diameter. The attachment shaft is gear driven from the spindle of the machine, assuring perfect synchronization. The chasing tool is carried on a double slide assembly mounted on the front cross slide and the thread is produced by several passes of the circular chasing tool along the work, cutting in one direction only. For any given set-up, the tool has a fixed path of movement relative to the cross slide, governed by a cam driven from the attachment.



trically operated automatic feed attachment can be provided.

Cutter Grinder

AN entirely new No. 2 cutter and tool grinder is announced by Norton Co. of Worcester, Mass. One of its interesting features is the anti-friction table which runs on balls held in a chain-like container. Hardened steel ways are used and an adjustable braking device permits creating a drag on the table where a freely running table is undesirable.

The cartridge type ball bearing wheel spindle is driven by V-belt from a 1-hp. motor carried on the lower end of a heavy column. Being a wheel-slide rather than a saddle machine, the table is solidly supported on the base with no overhang at the front. Supplementary handwheels at the rear permit operation from either side as well as the front, and toe holes in the base at front and sides permit the op-

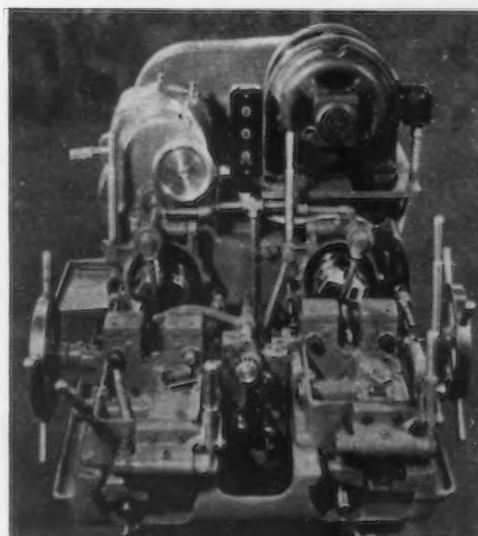


WITH a new type power work feed on the new Continental Doall 26 contour sawing machine, large work need only be lightly guided by the hand or steered through the band saw by a follow type hand wheel (not shown).

universal type of automatic wheel dresser may be used with this machine. With either type dresser, the control compensates automatically for the amount dressed off the wheel.

The machine has a manual retracting lever that enables the operator to retract the grinding wheel for removing the finished work piece and reloading. Lead accuracy is assured by the use of interchangeable master lead screw and nut assemblies like those used on the *Ex-Cell-O* No. 31 thread grinder. Adjustable table dogs automatically control the reversal of the table and the change in work spindle speeds. For high production runs on a wide range of work pieces, an elec-

SEVERAL fixtures have been added to a standard $\frac{7}{8}$ in. Landis double head threading machine so that the machine can perform pointing, beveling, turning and facing operations on bolts. The fixtures include milling cutters which replace the usual chasers, a spring actuated tool holder to carry the pointing and beveling tool, and the automatic work stop for positioning the work in the vises. The four milling cutters operating in a single plane about the axis of the work assure a uniform cutting action and round work. The pointing and beveling tools are carried in a holder extending through the spindle and may be adjusted from the rear of the latter.



erator to stand close to machine in any of the three operating positions.

The machine is available either as a plain cutter grinder or as a universal machine. Included as equipment with both models is a universal work head which takes milling cutters having the standard No. 50 taper. Supplied with it are a set of reducing collets, also a universal type left-hand footstock. The universal model includes additional attachments for internal, surface, cylindrical and gear cutter grinding. Other attachments are available for hob, form, face mill and long reamer grinding.

Wet and Dry Grinder

THE *United States Electrical Tool Co.*, Cincinnati, has recently announced a new heavy duty combination wet and dry grinder designed for heavy duty continuous production. The hood on the wet side has splash bowl with water reservoir and settling chamber, centrifugal pump, valve and adjustable nozzle. The V-belt has automatic take-up. The dry wheel guard is adjustable to wheel wear and has exhaust connection, hinged door for wheel replacement and adjustable laminated glass eye shield. Spindle is of chrome-manganese steel and is supported by heavy duty ball bearings enclosed in dust-proof housings. Motor control is push button with overload and low voltage protection. Motor is 3 hp., rated for continuous service at full load with a temperature rise of 40 deg.

Crossed-Axes Gear Lappers

A NEW line of gear lappers, of the two-lap type, and employing the crossed-axis method of operation originally introduced in gear shavers, is announced by *Michigan Tool Co.*, Detroit. Automatic in operation, the new machines are available in both vertical and horizontal models. The new machines are provided with electrical controls which permit adjustment of the lapping cycle from 2 sec. to 20 min., and are designed for high production lapping of moderate and small sized gears ($\frac{1}{2}$ to 8 in. diameter). Machines are also available in 1 to 12 in. capacity.

Fundamentally, the new machines employ a relatively low surface speed, with high speed of reciprocation of the laps across the gear faces—from 90 to 300 strokes per min. A change-gear box is provided, through which the lap spindle may be operated at speeds ranging from 52 to 283 r.p.m. A third

adjustment permits selection of desired reciprocating stroke length.

Two timers are provided to permit individual adjustment of desired lapping time on either side of the teeth. With the timers set, starting the machine results in revolving laps and spindle in one direction for the first pre-selected period, and automatic reversal and lapping of the gear in the opposite direction for the second pre-selected period. One lap spindle is thereupon retracted by means of a hand-lever, permitting removal of the lapped gear, and the next gear is then loaded in mesh with the second lap. The arrangement insures that laps and gear will always mesh properly, eliminating damage to laps.

Lapping compound is supplied through a special pump. Lubrication of vital parts of the machine is through a manifold oiler, eliminating the necessity of individually oiling the various parts. Work carrying spindles are provided with full length accordion type seals to protect bearings against lapping grit.

Contour Sawing Machine

A NEWLY designed follower type power work feed is one of the features of the Doall 26 contour sawing machine announced recently by *Continental Machines, Inc.*, Minneapolis. With the power feed, any curve can be cut by a follow type hand-wheel control, and no hand pressure is required. This feed greatly amplifies the machine's work capacity. The machine has a 26 in. throat depth, and a 30 x 30 in. work table that can be tilted 45 deg. front or back and on either side. Precision band saws of any width from 1 mm. up to 1 in. can be accommodated on this machine, which can also be used for file bands from $\frac{1}{4}$ to $\frac{1}{2}$ in.

Like other machines of the Doall line, drive is through a Speedmaster molded bakelite variable speed drive, employed in conjunction with a helical gear transmission and giving a band speed range of 50 to 1500 ft. per min. The exact speed is indicated on a tachometer dial, and the feed to select is given on a job selector dial for most types of material being cut.

Ram Type Turret Lathe

TO maintain accuracy during extreme cutting conditions, the rigidity of the bed of the new No. 4 *Warner & Swasey* ram type turret lathe has been increased 30 per cent

through the use of diagonal ribbing, a construction now standard on all but the smallest W. & S. machines. The pre-selector head is standard on this lathe, instead of being optional. Only one lever is required for shifting gears, and the pre-selected speeds are read in surface feet per min. as well as r.p.m. The head is lubricated by a new forced feed system supplied from a reservoir in the base and the lubricant is kept considerably cooler than when a splash system is employed. The spindle brake, another new feature, is an improved type that can be released after the spindle is stopped to allow positioning of chucks and fixtures.

There are six reversible power feeds, both cross and longitudinal for the universal cross slide. The square turret indexes automatically. The hexagon turret is equipped with adjustable stops for automatically tripping the feed for each turret face, and the turret may be indexed or spun in either direction to skip tool stations. This turret revolves on a tapered roller bearing stud and has replaceable wearing plates.

Keyseating Miller

A KEYSEATING machine that can also be used as a light type hand feed vertical milling machine for general tool room use has been announced by the *Reed-Prentice Corp.*, Worcester, Mass. Table (9 x 26 in.), saddle and knee are in accordance with the conventional hand feed milling machine, except that the handwheel controlling the table movement is set obliquely so as to allow long shafts to overhang without interfering with the longitudinal feed. Spindle head has two separate automatic feed movements, which can be locked out for hand vertical feed. One of the head feeds is a longitudinal crank motion, giving four rates of travel lengthwise of the table for each spindle speed. In addition five rates of automatic down feed are provided the spindle sleeve. With the crank drive, keyways up to $\frac{3}{4}$ x 5 in. can be cut or up to 20 in. when combined with hand table feed. Maximum depth feed is $2\frac{3}{4}$ in.

Spindle and crank motion are driven by V-belt from a single two-speed motor, giving a low range of spindle speeds from 290 to 910 r.p.m. and a fast range from 800 to 2350 r.p.m. Spindle is a sleeve type with the driven pulley mounted independently. Spindle nose has a split collet chuck furnished in a set of six sizes from $\frac{1}{4}$ to $\frac{3}{8}$ in.

THIS WEEK ON THE

By W. F. SHERMAN
Detroit Editor

ASSEMBLY LINE

... Extended deliveries on machine tools may restrict design changes for 1941 models ... Advance buying rules auto industry; inventory pile-up accentuated ... Auto production nears fall peak, waiting Chrysler strike settlement ... Foreign aircraft engine programs bring buying wave to Detroit.

DETROIT—Important buyers in the automotive territory are all buying on a three to six months advance basis and are being forced to look even further ahead for their requirements in machine tools and production equipment. These conditions are of extraordinary importance today because they have a direct bearing on the prospects for important changes in next year's models (1941 cars).

Short-term buying of all types of products, materials and supplies has virtually disappeared in Detroit, it is reliably indicated by the most recent buying survey of the Purchasing Agents Association. Hand-to-mouth buying, which at mid-summer was being practised by 28 per cent of the

important organizations in the city, has decreased so sharply as to be virtually non-existent, standing during October at only 1 per cent. A corresponding drop in 30-day buying brings the total for both of these classifications, combined, down to 2 per cent. At the same time, buying on a 60-day basis decreased to 13 per cent.

The major part (52 per cent) of all buying in this territory in the last month was on a 90-day basis. One-third of all the buying was on a more extended basis, either six months in advance (30 per cent) or nine months in advance (3 per cent).

So vitally important have been the changes gone through rapidly in the last few months, that results of the

entire survey of the Purchasing Agents Association are worth studying.

SURVEY PERCENTAGES (Detroit Area) General Business Conditions

	1939			
	July	Aug.	Sept.	Oct.
	%	%	%	%
Better than month ago..	22	54	78	63
Same as month ago.....	52	36	20	29
Worse than month ago...	26	10	2	8

Commodity Prices

Higher than month ago..	18	12	84	76
Same as month ago.....	76	86	16	24
Less than month ago...	6	2	0	0

Inventories

Higher than month ago..	19	39	70	72
Same as month ago.....	53	46	23	24
Less than month ago....	28	15	7	4

Collections

Better than month ago..	7	10	17	17
Same as month ago.....	82	82	76	80
Less than month ago...	6	4	2	0

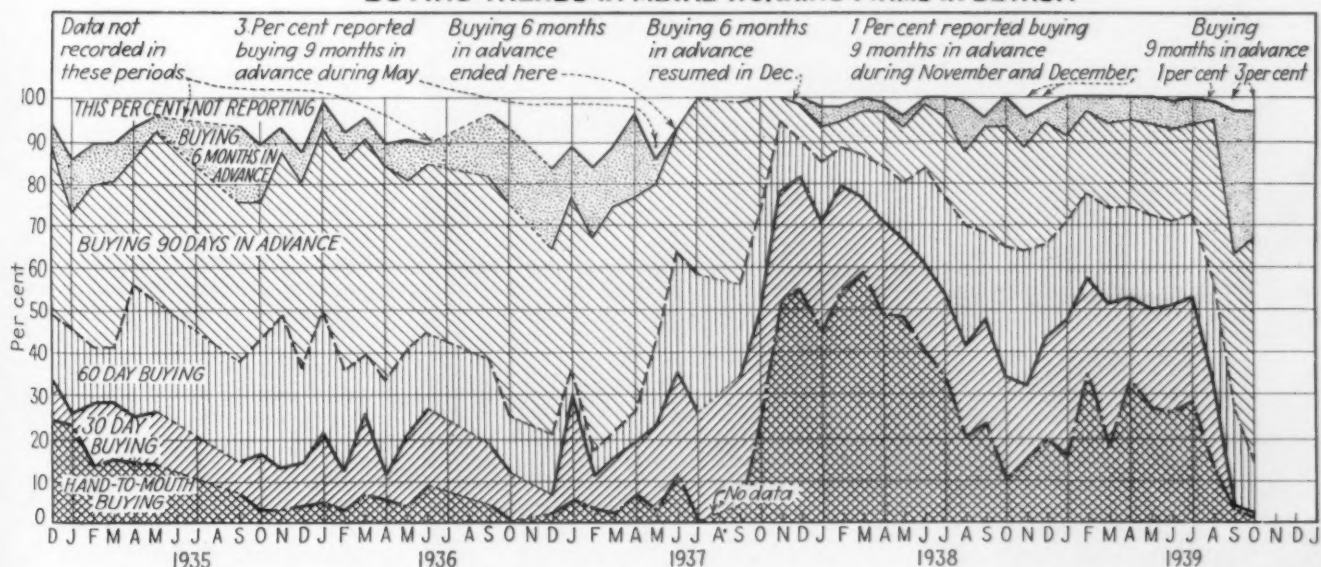
Credit

Ample	61	66	78	81
Slow	21	32	9	10
Tight	3	0	0	0

Employment

Greater than month ago..	20	41	63	59
Same as month ago.....	57	45	32	30
Less than month ago....	23	13	5	11

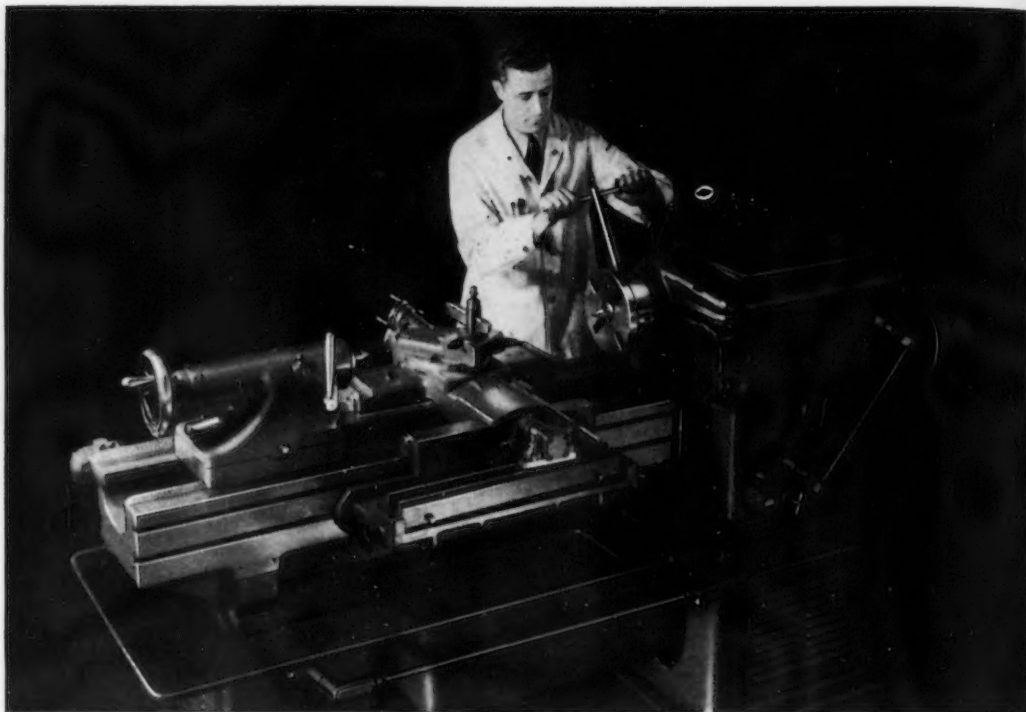
BUYING TRENDS IN METAL-WORKING FIRMS IN DETROIT



Prepared by THE IRON AGE from
data supplied by PURCHASING
AGENTS ASSOCIATION OF DETROIT

These data cover a wide industrial
field, including stove, refrigerator,
office equipment, steel, auto parts,
accessory and auto plants

The Pratt & Whitney Model "C" Lathe, available in several sizes and lengths, is precision-built by master craftsmen. It is the standard by which all fine lathes are judged. It delivers the kind of accurate trouble-free service that allows tool rooms to meet heavy demands without sacrificing quality. Complete literature on request.



Don't look now...

but when you do look

remember

• • •



The Keller Automatic Tool Room Machine is the ideal means of producing dies and moulds accurately, automatically and quickly. Here is the economical method of reproducing in steel the shape of a quickly made template or master pattern. It makes no difference if the shape is simple or intricate. It can be a blanking die, or a complicated drop forging cavity, or a mould for a new plastic product. In any case the machine cuts the shape in steel, using an inexpensive master model made from whatever material is most convenient. A Keller machine in your tool room will help you keep pace with increasing production needs. May we send you literature?



This is a Pratt & Whitney Jig Borer. It was created at Pratt & Whitney twenty-one years ago, and designed from the floor up for precision boring. It is built to the highest accuracy standards of any machine tool in the world. It is constantly setting new records for speedy, precise boring, and has never failed to deliver long, lasting, accurate service. It has always paid dividends to its users. Pratt & Whitney Jig Borers are in hundreds of tool rooms. Ask for information.



**over your production schedules...
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IS YOUR tool room a "bottle-neck" to production simply because your toolmakers lack modern equipment? Too often jigs and fixtures must be made with out-dated machines, while the production shop gets the newest time-savers.

Modern precision machines in your tool room will get your tools finished on time without sacrificing accuracy. Give your tool men a chance with first class equipment, and watch your troubles smooth out. When you need machine tools, small tools, gages or special machines—ask about Pratt & Whitney tool room equipment. There is no better paying investment than Pratt & Whitney dependable precision. Our sales engineers in your territory will bring you complete information. Call them in.

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Buying Policy				
Hand-to-Mouth	28	13	3	1
Future Buying Policy				
One month	25	19	1	1
Two months	19	25	23	13
Three months	22	38	36	52
Six months	6	4	34	30
Nine months	1	3	3	

The fact that all these percentages do not total 100 per cent merely indicates that a portion of the questionnaires do not reveal all the information required.

Inventory Situation Accentuated

The upswing of general business, which tapered off slightly in October, possibly because of two factors—the Chrysler strike and the fact that most buyers were well covered by the middle of the month—was accompanied by substantial increases in commodity prices and very distinct growth of inventories, conditions common, of course, in the entire country.

But the inventory situation has been accentuated in Detroit by a marked tendency to pile up stocks because of the fear that there will be more labor trouble. The Chrysler strike has been a factor, since it gave many parts and accessory manufacturers a chance to catch up on orders for other customers and then pile up stocks ahead of

schedule. Instances abound, but two widely scattered cases will illustrate. The old Continental Motors plant in Detroit, not being used now, has been used as a warehouse by a Chrysler supplier who before the strike was having serious difficulties in keeping up with Chrysler demand. The other case is at the old Highland Park plant owned by Ford. This is now being used as a Ford storage depot for parts and materials, including steel. Quantities are understood to be based on 30-day requirements.

Existence of these conditions has brought the machine tool industry in for a scanning. It is generally agreed that as long as milling machines, boring equipment and similar classifications are being quoted for very extended delivery (at least a year from now is reported in some cases) the auto industry has little chance to launch "big" programs for next year. By the time plans could be set—January, February and March are important release months—it is likely that delivery dates would be "out of sight" and impossible to consider seriously.

This leads to the self-evident conclusion that design changes for 1941

models will have to be predicated upon using the equipment now on hand or readily obtainable.

One index which appears to have attained its maximum is that of weekly automobile production. Until the Chrysler strike is settled and/or the men go back to work (we say "and/or" advisedly) there is no indicated possibility of further increases of output. During the last week assemblies rose to 86,200 passenger cars and trucks in the United States and Canada, from 82,690 units in the previous week, according to Ward's Automotive Reports. In the corresponding week a year ago the industry produced 86,094 cars and trucks. It is estimated that the fall peak, Chrysler excepted, will be 90,000 units per week or less.

General Motors production set a 1939 high mark last week when it totaled 47,630 cars and trucks, against 44,429 the previous week and 42,089 a year ago. This included 27,500 Chevrolets, also a 1939 record, and a gain of 2500 over the previous week. Ford edged upward to 22,000 Fords and Mercurys and 600 Lincoln-Zephyrs, compared with 21,300 and 525 respectively a week earlier. Chrysler eked out its last unit more than a week ago and in the last week not a single new model rolled off its assembly lines.

Frank comment in the industry points to the restraint exercised particularly by Ford during the strike period. With a potential output of 6400 units a day, and the inability of a competitor to fill orders because of strike conditions, Ford has shown no tendency to exceed approximately 4400 units maximum daily production. There are no positive proofs, naturally, but it is assumed that with new car demand at a record height, the company could easily make use of its latent capacity. Long before the strike, 4400 was revealed as the Ford goal; it has been reached, and suppliers believe that it will be maintained but not exceeded.

Ford Aiding Airplane Engine Project

Another typical Ford action was the withdrawal from the French deal for manufacture of Rolls Royce airplane engines while the United States had its embargo act intact. Reported on Sept. 28 (THE IRON AGE, page 106) was Mr. Ford's indicated decision before the outbreak of the war: "We can't build war engines in the face of our neutrality." It was predicted then in the Assembly Line that the project would be revived. It is. Under the new set up Ford tool engineering as-

THE BULL OF THE WOODS

BY J. R. WILLIAMS



sistance is being rendered and an expert from the Ford French plant at Matsford has set up offices in the Graham-Paige building to buy machine tools for manufacture of the engine. Previously it was planned to manufacture the engine in the Lincoln plant at Detroit.

In addition to this one Rolls Royce engine project, another has been launched directly by the English concern. It has opened an office in the General Motors Building and is in the initial stages of drawing up a tooling program (independent of the Ford-French program). Plans of Rolls Royce, Ltd., are reported to be extremely nebulous at the moment and subject to change, so it is difficult to learn the extent of the program, its exact nature and the location where manufacturing will be done. Machine tool salesmen are not being welcomed yet—because the program is so subject to change—but inquiries have been directed to machine tool manufacturers asking one, and only one, question—delivery dates obtainable.

Chrysler Strike May End Soon

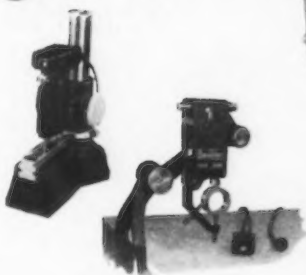
The Chrysler strike continues with a particularly severe set-back for men involved because of the decision of the Michigan Unemployment Compensation Commission denying unemployment benefits to approximately 50,000 Chrysler workers who are idle. A provision of the State law denies such financial assistance to any worker unemployed due to a labor dispute in progress in the establishment in which he was working.

Chrysler has considerably restricted its activities in offices and engineering departments—with a heavy layoff taking place last Friday.

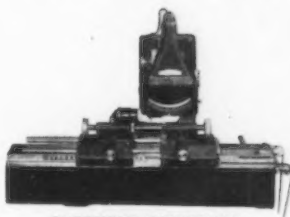
A contrary indication came in the release of orders for important production tools and insistence for their delivery in the early half of this week.

Strike negotiations are approaching a critical point, as also is the temper of the men and the attitude of the union. While many free-lance guessers have talked a great deal about a return-to-work movement that would break up the strike and the UAW along with it, much of this is really just wishful thinking. Certainly, Chrysler appears to be on the road to winning this strike and justifying its position and principles, but a sensational victory just isn't likely. Within a week or so, probably a settlement will be reached on paper and a new contract signed by both sides. It will restrict the union from many of its former practices, without a doubt, and will be generally more favorable to the company than the former contract.

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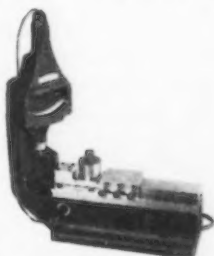
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THIS WEEK IN WASHINGTON

... B. F. Fairless, president of U. S. Steel, and E. G. Grace, president of Bethlehem, in testifying before TNEC, leave question of first quarter prices unanswered ... E. T. Weir, Charles R. Hook, Dr. H. A. Baker, A. R. Pfeltz, Harold A. Hughes and others on witness stand.

By L. W. MOFFETT
The Iron Age

WASHINGTON—Leading steel manufacturers testifying during the past week before the TNEC left unanswered the question of what steel prices will be for the first quarter of 1940.

The witnesses, including heads of some of the largest companies, discussed in detail financial aspects of the steel business. E. T. Weir, National Steel Corp. chairman and president of the American Iron and Steel Institute, rejected interpretations of Leon Henderson, a member of the TNEC, and A. H. Feller, that steel companies would be forced to stay out of the market, under certain unfavorable conditions, if the industry adopted the price policy suggested by Mr. Weir on Oct. 17 in New York before the American Institute of Steel Construction. In the address Mr. Weir declared that "management simply has to determine now and at all other times that it will not accept business at a price which does not include costs and a reasonable profit." He pointed out that the job of each individual company is to see that its prices cover its own cost, "not empirically established costs of its industry."

Mr. Feller, whose view was shared by Mr. Henderson, pictured the position of individual companies, when operations, as in the first quarter of 1938, were at the rate of about 35 per cent, with the major steel demand coming from the automobile industry.

Need Not Stay Out of Market

"Now, is it not a fact that if all companies were at that time to follow your suggestion, that it would mean, in effect, that those companies which, by virtue of location, are not

favorably situated to secure their own costs plus profit from the sales to the automobile industry, would be required to stay out of the market, should stay out of the market?" asked Mr. Feller.

"No, they can't be required to stay out of the market," replied Mr. Weir.

"I don't mean required legally, I mean following out this theory," Mr. Feller explained.

"No, they can't be expected to stay out of the market," Mr. Weir insisted.

Mr. Feller wanted to know of Mr. Weir what he would suggest if he were in the position of a company at Pittsburgh which found that the only way it could sell steel which has been set by virtue of the bargaining between the Detroit steel company and the Detroit automobile manufacturers would be to sell below cost or at cost without profit.

"Well, Mr. Feller, the determination on prices is not made with regard to any one product," replied Mr. Weir. "As an example, we have a plant in Detroit, the only steel plant in Detroit. We don't sell all of our products to the automobile companies. We have to sell products produced in Detroit to other territories. And in those other territories we may have to absorb freight, so that our determination of the price at which we would sell the automobile people is based on the determination of our position, taking into consideration all of our products, and the freight absorption which we must have in delivering into other territories—all steel companies have a freight absorption, under the principle on which they

work of selling and delivering into all consuming territories."

Further in his comment, Mr. Weir said it is necessary to consider an overall picture.

"The basis on which we sell," he stated, "is average consideration. We get an average net price that prevents us from losing money."

Senator King asked Mr. Weir if he did not balance returns in a favorable field with returns in an unfavorable field so that "by and large you sell at a very small profit."

Wants to Sell in All Markets

Mr. Weir said that the steel industry zealously guards its right to sell in all markets. Mr. Feller interjected doubt that the industry should sell steel on this basis. Senator King broke in to inquire if the steel policy of guarding distant markets did not tend to protect competition and if such a policy were not followed such markets would be surrendered to others. Mr. Weir agreed with the Senator's conclusion.

Mr. Henderson, who arrived late at the hearing, however, suggested that Mr. Weir's reply to the Utah Senator was contrary to the policy the steel executive suggested in his New York speech. Mr. Weir told Mr. Henderson he was not present when the former explained his position to Mr. Feller. Mr. Weir set forth his position to Mr. Henderson.

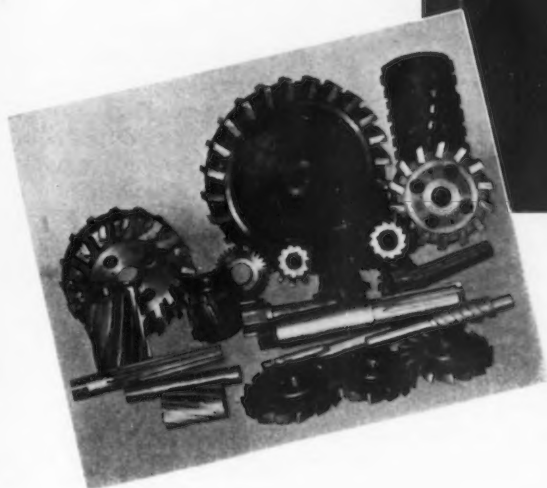
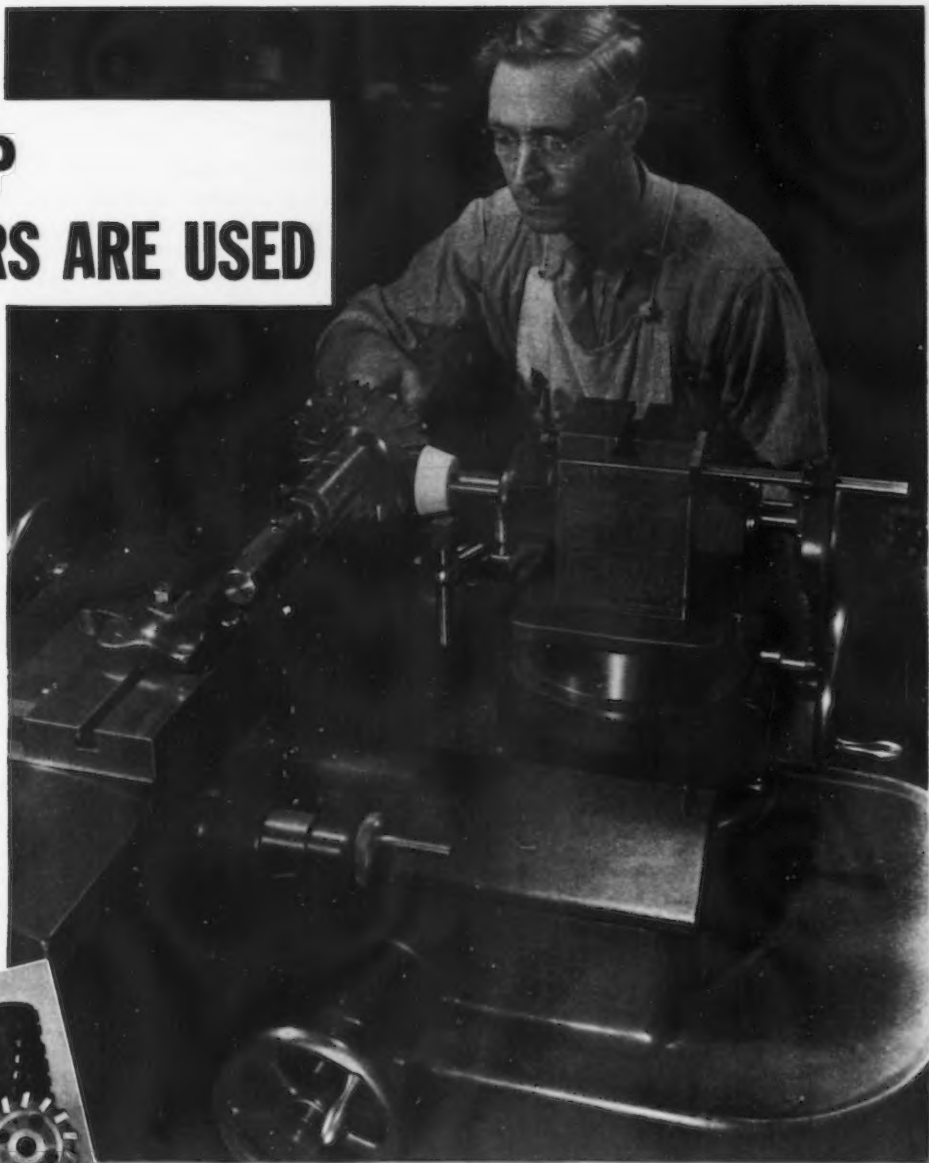
Mr. Weir told Senator King there was no advantage to any company in breaking prices down below costs. It was stated that there are no secrets in the industry and once prices are broken the fact becomes known in the industry and the entire price structure is broken down so that no one gets any advantage.

"The company that does that thinks it is getting an advantage in relation to covering its overhead costs, doesn't it?" asked Mr. Henderson. "And as I gathered from your paper also, you felt that they weren't correct in that, and from your testimony now, that they were exercising poor business judgment when they did something like that."

"They are not only breaking the price on this particular sale on themselves, they are breaking the price on practically everything they sell," said Mr. Weir.

"I gather this is a serious thing in your industry," interposed Mr. Hen-

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derson. "Time and again somebody does break that price, thinking it is to his advantage to do it."

Cites Extreme Competition

"Yes, it is a rather common practice," said Mr. Weir. "As I have stated, there is extreme competition in the steel industry. The United States Steel Corp. puts out its prices at the first of every quarter, but the actual prices are made through the day by day competition in the market. It has been unfortunate over these last nine or ten years that this competition

eventually has resulted in prices that have been so low and below the costs so that the companies on the average have netted a loss."

"In a period in which you were building up National, particularly in the period when you were developing Weirton, what was your practice about cutting below the base price?" inquired Mr. Henderson.

"Well, of course, the theory on which we operated, Mr. Henderson, was that we were meeting competition," Mr. Weir responded.

"Do you mean the theory that you operated on there was that you never initiated it but that you met it?" asked Mr. Henderson. "Is that it?"

"That was the theory," said Mr. Weir.

"It wasn't the actual practice, though, now, was it, Mr. Weir?" Mr. Henderson further asked.

"I certainly wouldn't say so," said Mr. Weir.

"Then to that extent you were doing just the thing that calls up the condemnation that Senator King has indicated," Mr. Henderson suggested.

"No, the condemnation is not of the practice of competing and not securing prices that have been posted by the Steel corporation, but the condemnation is carrying the competition to the point of where the prices eventually get down below the cost of production," replied Mr. Weir. "I have no criticism of the competition that exists in the market from day to day."

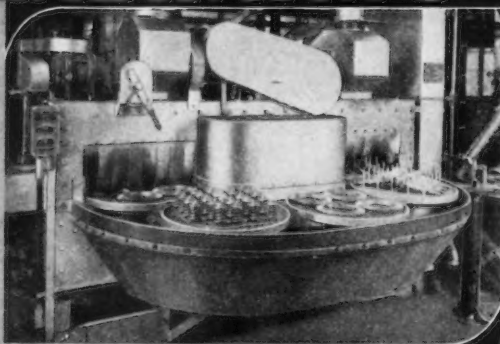
Selling Below Costs Injurious

Mr. Weir told Senator King that the National Steel Corp. was never in the red and always paid dividends though some of them have been small. He added, however, that the industry cannot be viewed simply from the point of his company. Mr. Weir emphasized that it is necessary to look at the overall picture. The industry constantly is making improvements, it was pointed out, and they require enormous expenditures. Mr. Weir said that if a policy of selling below costs is continued it will be detrimental to the industry as a whole and it will also be detrimental to his company. He declared it was hard to understand how such a policy could be continued and maintain the industry. He spoke of an \$80,000,000 loss suffered by the industry the past nine years and had previously said it cannot afford to increase its fixed charges. Yet, he said, it must make improvements. The only way to do so, it was stated, is to sell common stock and he expressed the opinion that only a few companies can sell common stock.

In a subsequent discussion he said he believes the National Steel Corp. could sell common stock to the public but that on account of the general situation he doubted that it could be sold at its price. Mr. Henderson inquired if Mr. Weir didn't think the public would be "enamored" of the great record of National. Mr. Weir reiterated he did not think the stock could be sold at its price. He said that over \$100,000,000 has been spent on the company's Detroit (Great Lakes Steel Corp.) plant but that it

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Delco-Remy Div.Anderson, Ind.
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Vincent Steel Process Co....Detroit, Mich.
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is "yet by no means a complete plant." He estimated that from \$30,000,000 to \$35,000,000 will have to be spent at that plant over the next three years. He said the plan concerns stockholders who are not interested in buying more common stock and that he does not know where the money is coming from.

Easier for National to Make Profit

"That's one of the most important statements made to the committee," Mr. Feller said after Mr. Weir expressed the opinion that it is easier for his company to make a profit than it is for a company of the size and ramifications of the United States Steel Corp. In amplifying, Mr. Weir said he was referring to his own and not all small companies. He further added that when demand is great and operations heavy, he thinks that the Steel corporation has advantage over competitors because its cost per ton would be lower.

Mr. Henderson read from a column by Gen. Hugh S. Johnson, former NRA administrator, quoting Mr. Weir as saying that "the trouble with our big economic empire is that it is too big to manage—there are not enough brains."

Mr. Weir said he certainly was not correctly quoted. He stated he had a discussion of one and one-half hours with General Johnson and that he had criticized management for not making sufficient profit. He said he had stated it ought to be more difficult for a large corporation like the United States Steel Corp. to make a profit when demand is off.

"Probably today the Steel corporation's costs are below ours," said Mr. Weir.

He declared he had said nothing in criticism of the Steel corporation.

At one point, Representative Clyde Williams, of Missouri, inquired of Mr. Weir whether he could explain testimony given previously by other steel executives that their companies had suffered large losses in recent years.

"The executive management is at fault," said Mr. Weir. "It never is justified in letting prices get to a point where loss results. Competition is so keen in the steel industry that an ordinary salesman has been given authority to get business."

Asked by Mr. Henderson if the establishment of additional basing points, the elimination of basing point differentials and the reduction in base prices in the summer of 1938 had the effect of taking away "the umbrella held over smaller mills," Mr. Weir said he had often heard rumors but had never

subscribed to the theory of the umbrella. He said he could see no change in the situation, pointing out that price reduction inaugurated then merely represented the going prices at that time.

"If I thought I was sitting wholly under the protection of an umbrella," Mr. Weir observed, "I'd be very much uncomfortable."

Grace Discusses Price Increases

Eugene G. Grace, president of Bethlehem Steel Co., told the committee on Thursday that if an examination by

his company discloses it is making a reasonable profit he does not want increased prices for the first quarter but that if costs are found to be rising to the point where earnings are reaching the vanishing point, "then we ought to have a price increase."

Mr. Grace, called before the committee with Paul Mackall, vice-president of Bethlehem Steel, gave this information to the TNEC during the course of a discussion with Mr. Henderson, who questioned the witnesses as to whether he thought the industry



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U. S. Steel Has No Control Over Trade Papers, Fairless Says

WASHINGTON—A letter written by A. R. Pfeltz, vice president, American Can Co. to President Benjamin F. Fairless of the United States Steel Corp. in April, 1937, in which "control over metal trade journals" was mentioned with respect to tin plate prices, was characterized by Mr. Pfeltz as "very badly worded" when he was questioned during hearings last week before the Temporary National Economic Committee.

Explaining that erroneous information affects the company adversely and that "if you disturb our customers at the wrong time of year it certainly doesn't help them to take our cans," Mr. Pfeltz told TNEC investigators that his letter was merely a request that Mr. Fairless "be careful to see how his boys handed out their information."

The reference to trade papers was listed among five other points which the letter said had been discussed by Mr. Pfeltz and Mr. Fairless. The paragraph read:

"Control over metal trade journals in the publication of prices on tin plate, and the elimination of such comments as are foreign to the subject (from our standpoint)."

"If trade papers don't get their information from those in authority, you know how they pick a thing up and make a big story over nothing," Mr. Pfeltz

asserted, after being reminded by A. B. Feller, Justice Department attorney conducting the steel hearings, that purchasers of cans are very much interested in finding out any weakness in tin plate prices and that their only source of such information would be through the trade papers.

B. F. Fairless, president, United States Steel Corp., was also asked if he recalled the incident.

"Yes," Mr. Fairless said. "Trade papers unfortunately—and I say that advisedly—are looking for news and aren't always too careful as to the source. They are always ready to correct any mistakes but many times the damage has already been done."

In response to a question by Leon Henderson, former executive secretary of the TNEC and now SEC commissioner, Mr. Fairless said that his company exercised no control over trade papers.

"Trade papers cooperate with us and their policy is to print facts and to come to us and get facts. Our desire is to cooperate with them. Many of our customers depend upon trade papers for prices on particular commodities," he added.

"Do you have any financial interest in such papers?" asked Mr. Henderson.

"No. Oh, my no," Mr. Fairless answered.

ought to get back to 1937 prices. Mr. Grace was on the stand for more than four hours.

Like Mr. Fairless, Mr. Grace left unanswered the question of what the steel industry will do about first quarter prices, a subject on which Administration advisers have expressed considerable interest in recent weeks. Throughout the steel hearings there has been no admission by steel industry representatives of Administration pressure against price increases yet it has been obvious throughout the sessions that first quarter prices are uppermost in the minds of at least the key members of TNEC representing executive departments of the Government.

Questioned by Mr. Henderson, who said that any price reductions initiated by Bethlehem would require the company to adopt an independent price policy, Mr. Grace agreed, pointing out that the only other alternative would be for members of the industry to sit down together and develop a price policy. Mr. Grace, however, was quick to dismiss such a plan as unwise and he told the committee that while he thought the NRA steel code was one of the better prepared and administered codes, the industry would be far better off to abandon that type of control of business.

Mr. Grace also dismissed as undesirable a point raised by Mr. Henderson

that the company might find it advisable to proceed along the lines embodied in the cartel system for handling foreign business with its concomitant problems of allocation of production, price agreements, and contracts to keep out of certain markets. The president of Bethlehem Steel said the system would not be adaptable to domestic business.

He agreed with Mr. Henderson, however, that sharp rises and abrupt drops in steel production are injurious to the industry but declined to go along with the SEC commissioner on a plan approaching the English system. Mr. Henderson said he had been reading in the economic journals that in England it was believed to be a tremendous stabilizing factor to know in advance that prices would remain at existing levels and he wanted to know whether a similar system might not work out to advantage in this country. He qualified his remarks with the suggestion that he was not advocating such a plan but merely was interested in learning whether from information on inventories, questions about price policy or a guaranteed volume of business it would not be possible to get a fairly reasonable sustained volume of production.

"That would be a very new order," was Mr. Grace's reaction. "It would be going further than the NRA control of business."

After Mr. Henderson described himself as more of an advocate of "laissez faire—opinion to the contrary notwithstanding," Mr. Grace continued:

"If we could appraise steel demand for automobiles, railroads and construction work, if we could have advance notice of conditions following the law of supply and demand, and peaks and valleys could be ironed out to create more certainty, that would be useful. But how to bring that about, I don't know."

In illustration, he pointed to the automobile industry, with its consumption of about 20 per cent of steel output, citing the element of uncertainty surrounding the question of whether automobile production next year will be 2,000,000 or 4,000,000 units.

Asked by Mr. Henderson if it would be helpful if Government demand for steel were stabilized or known in advance, Mr. Grace responded that the factor of Government buying is infinitely less important than the demands of the automobile industry.

"It's really just a flea bite," Mr. Grace said.

"But you like to be bitten by the flea," countered Mr. Henderson.

Want No Battleships

"Not when it comes to battleships," was Mr. Grace's reply. "I wish we never would have to build another



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AGENCIES IN PRINCIPAL INDUSTRIAL CENTERS THROUGHOUT THE WORLD



SHOWN here are leaders in the iron ore business testifying in the TNEC steel hearing at Washington. They are, left to right, Elton Hoyt II, Pickands, Mather Co.; Crispin Ogelbay, Ogelbay, Norton & Co.; Emmett Butler, Butler Bros., St. Paul, Minn.; Patrick Butler, Butler Bros.; E. B. Greene, Cleveland-Cliffs Iron Co., and George M. Humphrey, M. A. Hanna Co.

battleship. I don't want that kind of business."

Mr. Grace, who earlier in the day described his company as "war baby No. 1" during World War days, told Mr. Henderson that his organization is always looking for stabilizing factors but that it had never reached the stage where the outlook was promising in that respect. All basic industries are in the hands of the purchasing public, Mr. Grace said, adding that "we're at the mercy of their whims."

Further interchanges between Mr. Grace and Mr. Henderson developed the testimony that Bethlehem Steel has advised its customers "not to get stampeded" during the present heavy increase in demand and "not to inflate your ideas."

"The element of speculation is ruinous," Mr. Grace cautioned. "Business is not being conducted at its best when production is going into inventories. Under those circumstances we're robbing tomorrow."

Commissioner of Labor Statistics Isador Lubin told the witness that one shipbuilder had recently ordered a year's supply of steel and that under such circumstances that buyer will not be in the market next spring. If that situation is typical of the inventory

situation, it constitutes a threat to steel demand next spring, Mr. Lubin reasoned, asking if the shipbuilder, for example, would have placed his large order for steel if he knew the price would not increase in 1940.

Mr. Grace's answer was that the steel is priced throughout the life of the shipbuilding job and that, on that basis, "we carry the bag." He added that there is a great deal of business done that way.

Like Mr. Fairless, Mr. Grace also was questioned about pricing policies with respect to tin plate. He conceded that Bethlehem follows the price negotiated by Carnegie-Illinois and American Can, but that on occasion "we have taken the business at less than the official price." The reason for following the Carnegie-Illinois price, he told the committee, is because, in the opinion of his company, that price sets the competitive price.

As for arriving at a price by consultations in the industry—a subject brought up several times by Mr. Henderson after the Pfeltz letter was introduced in the record—Mr. Grace said he saw nothing in March, 1938, that looked like a price conference among industry members. He pointed out, however, that it was perfectly

natural for one member of the industry to casually ask Mr. Fairless, while price negotiations were pending with American Can, "how they were getting along."

Asked for his understanding of the anti-trust laws in this respect, Mr. Grace responded:

"I should say I have a definite feeling and belief that I could not sit down with competitors and agree upon a price schedule and see that it was kept in effect. That would be a violation of the anti-trust laws."

Asked what he thought would be done if that law was not on the statute books, Mr. Grace said that he had given no thought to such an eventuality.

Recounts Advances in Steel Industry

Unsuccessfully, Mr. Henderson sought to draw from the witness that changes in labor conditions and other progressive steps had largely been the result of governmental influence down through the years and he mentioned specifically, the reduction in working hours, the elimination of Pittsburgh plus and the establishment of additional basing points.

Mr. Grace replied that he had always believed that the Government had a certain function to perform—

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Extras 9.9% On 10 Selected Steel Products, TNEC Hears

ACCORDING to an analysis made by the Department of Justice for the Temporary National Economic Committee, the extras in a group of 10 selected steel products shipped in February, 1939, amounted to 9 9/10 per cent of the total invoice delivered

value of these products. This average covers a wide range, from 0.7 per cent in the case of cold rolled sheets to 29.7 per cent in the case of cold rolled strip. The figures as to each product and the aggregate for the group appear in the following table:

Product	Total invoice delivered value	Tons	Extras per ton	Extras as percentage of delivered value	Extras as percentage of calculated base price
Sheet and tin plate					
bars	\$248,875	8,198	\$0.05	*	*
Wire rods	1,220,140	27,141	2.56	5.7%	6.4%
Plates	4,749,948	96,443	4.02	8.2	9.5
Heavy structural shapes	3,802,049	79,921	1.89	4.0	4.6
Sheets and H. R. & H.					
R. ann.	9,866,083	190,910	9.70	18.8	24.5
Strip, H. R.	3,298,084	67,896	6.04	12.4	15.2
Sheets, C. R.	5,176,127	82,919	0.45	0.7	0.8
Strip, C. R.	1,660,076	17,728	27.79	29.7	45.0
Tin plate (95# box)	2,975,082	29,036	—4.02	—3.0	—4.0
Plain wire, drawn	995,309	17,166	3.96	6.8	7.8
All Products	\$33,991,783	617,358	\$5.43	9.9%	11.6%

possibly a "policing job" although he qualified that with the comment that that probably was not a good term.

"I've seen a gradual change from a 10-hr. day, to a 6-day week, an 8-hr. day, a 40-hr. week," Mr. Grace declared. "It's all been progress developing substantially within the industry itself. I am glad we're there. I don't want to see it go to the point where we're not going to get constructive progress."

After characterizing himself as "old fashioned" enough to believe in the necessity of "making a profit" and after Mr. Henderson described himself as "old fashioned" enough to agree, Mr. Grace recounted the advance made in industry during the past 40 years of his experience.

"There has been a 37 per cent improvement in wages since 1939 and selling prices are quite close to those of 1929," he said. "The steel industry is beginning to make a little money. I think that is a fine development. In order to be reasonably right our economic and industrial policy must go hand in hand."

Earlier in the session, Mr. Grace had been questioned closely about the organization of Bethlehem Steel Co., its pricing policy, extras, labor rates, iron ore properties, and its policy with respect to Government business. He

told the committee that his organization had not gone out as aggressively after Government contracts as it had for other business and that while price concessions from base prices had frequently been made it had not been the company's practice to make concessions when bidding for Government contracts.

Asked by Mr. Feller if he had welcomed the elimination of the Birmingham differential in the summer of 1938, Mr. Grace responded that "I don't know that I had any particular thought on the matter." The basing point system does not make prices, Mr. Grace explained, it is "only the medium for making a price." He told Mr. Feller that shortly after a plant gets into substantial production the policy of the company would be to establish a basing point but that there also are other reasons, among which he listed the element of extending the company's competitive ability. Mr. Feller's idea, as reflected by his line of questioning, would be to establish basing points for all mills and thereby further increase the competitive ability and the effect, according to Mr. Feller, would be a lowering of the price.

Explains Continuous Mill Licenses

How the American Rolling Mill Co. developed the continuous strip and

sheet rolling mill and licensed 13 steel companies with a capacity of 13,000,000 tons annually was described to the committee by Charles R. Hook, president, who followed Mr. Weir on the stand and testified that improved quality, increased range of sizes, removal of human hardships and reduced prices compelled the industry to discard hand equipment valued at more than \$100,000,000.

Going into detail on the subject of fixing a price on patented products and products made by patented processes, Mr. Hook told the committee that of the 13 companies licensed under American Rolling Mill patents, eight are operating under a uniform license agreement, prepared in 1937 and made effective in April, 1937. The license, which requires the payment of 10c. a ton royalty on only certain sizes of sheets, a small fraction of 1 per cent of the selling price, was designed only after careful consideration and after consulting "the very best legal advice on the subject," Mr. Hook asserted.

After checking all authorities and court decisions on the subject, Mr. Hook continued, "we were advised that we had a right to a reasonable price control and we felt that it could not be successfully controverted especially if we ourselves conform, or in other words, if we at some time set a minimum price below which the material should not be sold, we would bind ourselves not to sell at a lower price."

"To make the matter perhaps a little plainer," Mr. Hook added, "we would not attempt to set the price, we would only state a price below which the material should not be sold, and we reserved the right to determine if it were desirable so to do, very clearly avoiding any obligation to set a minimum price."

He revealed that in October, 1929, and again in April, 1931, the Federal Trade Commission, prompted by complaints filed with the commission, requested the company to submit copies of its licensing agreements. This was done, he related, and the copies returned with the assurance from the FTC that it had "found no necessity for the exercise of those remedial powers granted by law to this commission." The witness explained that some companies, because there has been no direct Supreme Court decision on the subject, do not have anything relating to a price control in their contracts which, he said, constitutes the major difference in license agreements.

Mr. Feller, recalling that one of the matters of concern to the committee was price-fixing agreements in patent

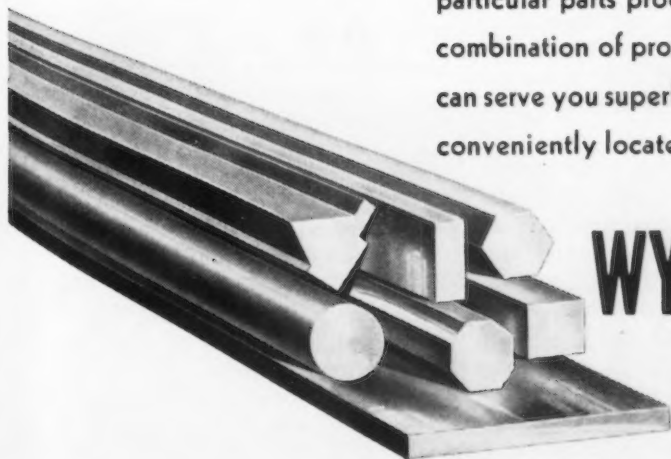
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licenses, asked Mr. Hook's views as to why his company should be permitted to have such a provision in its licenses.

When an individual or a corporation takes the risks involved and spends large sums of money, it should have protection against the possibility of competitors ruining the business. Mr. Hook replied.

Did Not Exercise Rights on Pricing

"It takes a good many years to get back the hundreds of thousands of dollars expended in development," Mr. Hook went on. "That is what encourages a company to spend money and plan something in the interest of the public so it won't be wrecked during the years it is trying to get its money back. We reserve the right in our contracts to set a price although we didn't exercise the right because we didn't want to have litigation. The royalty was so low we thought it wasn't anything to fight over but retaining the price clause is indicative that we felt we had a perfectly legal right to set a minimum price."

"If you are compensated by your royalty per ton," asked Mr. Feller, "why is it necessary to protect the price structure?"

Responding that his company had not set out to do that, Mr. Hook defended retention of the price clause, pointing out that the development of the continuous mill was so revolutionary that others might have gone out and fixed a price that would wreck the market. He insisted that any

patentee ought to have that protection, adding that "otherwise you kill the incentive for invention and development."

"Assuming that the legality of this arrangement has been settled by legislation or in the Supreme Court, the determination of the minimum price would then be in your hands," Mr. Feller insisted.

"Only on certain products," Mr. Hook agreed.

After Mr. Feller "questioned the desirability of having price clauses of this kind in effect," Senator King interjected the thought that the Department of Justice attorney might be attempting "to lay the foundation for modifying the protection granted by the Constitution of the United States."

"I am not trying to lay the foundation for anything," Mr. Feller countered.

Mr. Lubin expressed the view that at the time Mr. Hook's company developed the continuous strip mill process, it had two alternatives; that is, it could have done what it did and license other companies, inserting a price clause in the contracts, or it could have withheld the process for its exclusive use. He asked Mr. Hook whether if different legal advice had been given his company might not have followed the second course. The witness concurred with Mr. Lubin that such might have been the case.

No Displacement of Labor

Mr. Hook told the committee that the average price per ton received on

all grades of sheets had declined from \$95.50 in 1924 to \$73.87 in 1929 while the price of other manufactured products had gone up generally during this period. Asked if the result of the continuous mill had resulted in a substantial displacement of labor, Mr. Hook replied in the negative, explaining that his own company employed 6060 workers in 1923 and that in 1938 the total was 10,384. As for the other companies licensed to employ the process, Mr. Hook said that four had submitted incomplete returns showing that they employed a total of 11,769 employees in 1926 and that this number increased to 23,678 in 1937; that is, in departments doing the rolling job. He estimated that in eight companies there had been an increase of 34.3 per cent in number of men employed, pointing out in summarizing that the net result had been a lower priced product, more employees, a better product, and higher wages.

Explains Policy on Semi-Finished

On resuming the witness stand last Tuesday (Nov. 8) B. F. Fairless, president of the United States Steel Corp., was asked by Mr. Feller whether, if any changes were made, the price of semi-finished steel should be increased or decreased in relation to the price of finished steel.

Mr. Fairless replied that the policy of the Steel corporation and its manufacturing subsidiaries is to sell users semi-finished material at prices so that it can be converted into finished products and compete in the finished market. The result of that policy has

A Statement to the TNEC by B. F. Fairless, President U. S. Steel

WE feel keenly the responsibilities to 235,000 workers whose daily bread depends upon our decisions. You must remember some 40,000 of our workers have invested their savings in shares of stock of our corporation. Close behind them are the thousands of supply dealers and shopkeepers, large and small, in the cities, towns and villages where our plants are located. Then there are the 220,000 stockholders, most of whom have had a lean time of it since 1931, the common stockholders having received only one dividend of \$1 per share, paid in 1937. And finally—I do not put them last—there are our customers and the general public whom we serve. We feel it is our duty to work with and

protect each of these groups to the best of our ability.

The mere fact that our losses have been quite consistent, as well as substantial, since 1930, except in three years, should indicate that the price of steel has been so low that, with the volume we have had, only a meager profit has been made during this nine-year period.

We have spread the work in poor years, and by this means have been able to keep an approximate average of 60,000 men employed beyond the strict needs of the business available. At every point we have done our best to cooperate with the Government in the efforts to improve the distressing

conditions which have prevailed. These are the facts of the great, prolonged depression through which we have been passing.

While we sincerely desire to provide constant and regular employment for our employees, I cannot recommend following any untried theory in this important and complex business in attempting to accomplish this result. I have to move cautiously, taking into consideration all of the basic factors of the steel industry and seeking all the help and advice I can get from the experienced men around me.

We have spent our business lives in the industry and I think are fully qualified to deal with the problems of the United States Steel Corp.

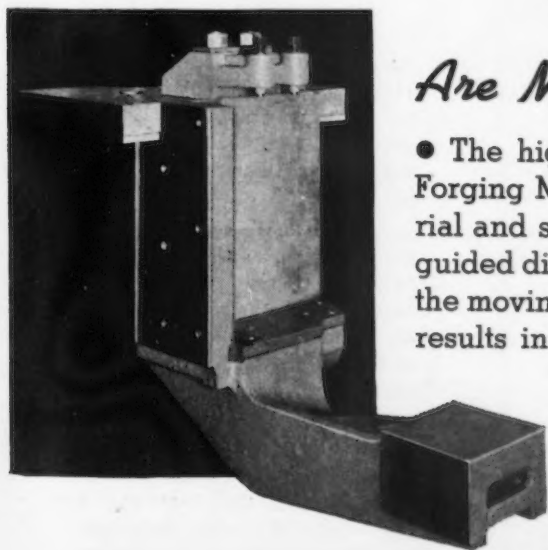


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been, particularly during the past nine years, Mr. Fairless said, that prices were so low at times that the Steel corporation did not get back a new dollar for an old one. An attempt is always made, it was stated, to keep the relation and the spread in conversion so that a reasonable profit can be made. But, Mr. Fairless pointed out, competition is so great at times that the published prices cannot be realized. Constant contact is kept with customers, it was said, and adjustments are

made even though they involve prices below published prices. To indicate that customers are treated fairly, the witness said he was sure that the record of earnings of non-integrated companies during the past nine years shows they made better earnings than did the integrated companies. Non-integrated companies' investments, it was explained, are in finishing mills, while the Steel corporation's lie back of that, representing by far its greater investment.

Questioned further, Mr. Fairless said customers are kept in a competitive position with respect to products they sell and it was always found the spread provided satisfactory profits under satisfactory operating conditions. The Steel corporation, it was declared, has no control over the market prices, Mr. Fairless adding that if customers do not get realized prices adjustments are made with them.

Mr. Feller suggested that there is an economic problem to be solved because of the alleged power of the Steel corporation to control prices. Disagreeing sharply, Mr. Fairless replied that when the industry is operating at less than 60 per cent, as it does many times, any integrated company is a potential seller of semi-finished steel. Hence, it was stated there can be no control.

"But at 92 per cent rate you can control?" Mr. Feller suggested.

"You've seen our fourth quarter prices," responded Mr. Fairless to remind the Department of Justice representative that they had not been changed.

"Oh, yes, sir," Mr. Feller said. "We do not imply you have exercised such power."

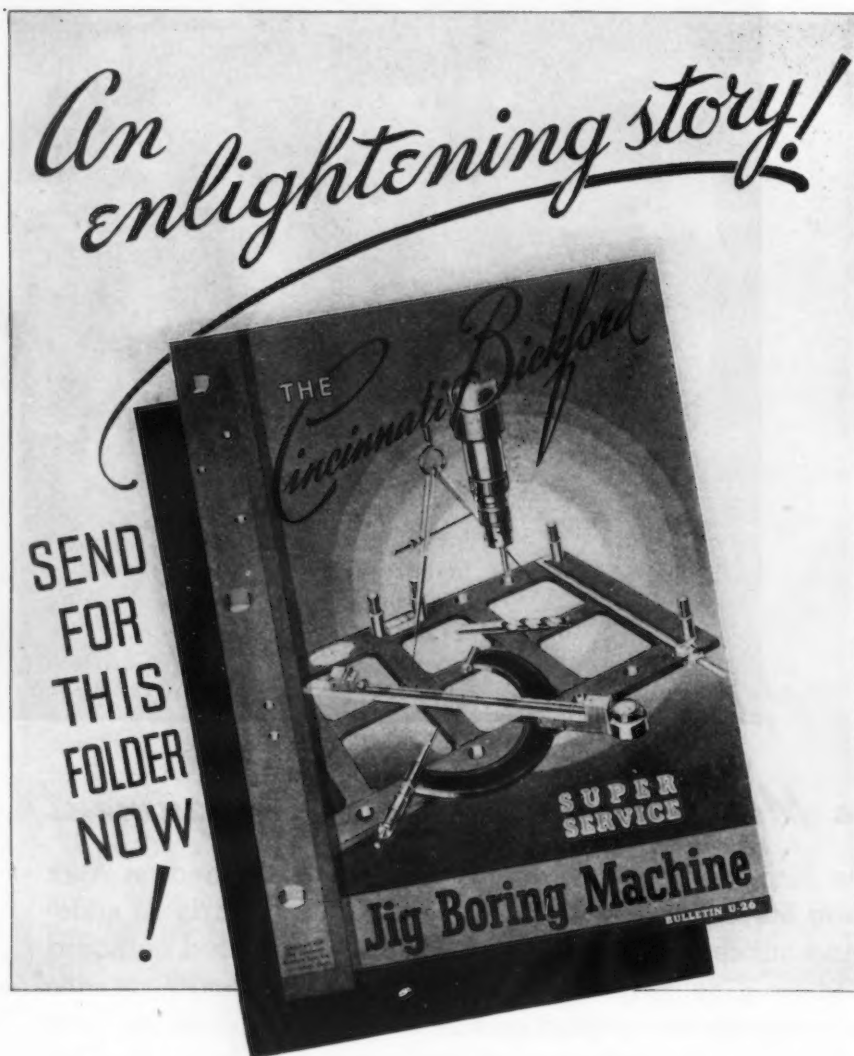
Mr. Fairless observed that any man is a potential criminal but that does not mean he exercises the power. He added that it would be impractical to exercise power over semi-finished prices because to do so would destroy markets.

Tin Plate Pricing Discussed

Turning to tin plate and can prices last Wednesday, Mr. Feller kept Mr. Fairless on the stand and called H. L. Hughes, vice-president of the Steel corporation, and Dr. H. A. Baker, president, and A. R. Pfeltz, vice-president of the American Can Co., as joint witnesses.

Answering a question by Mr. Feller, the president of the Steel corporation said that there is about 1½ lb. of tin to a box of tin plate and that while the value of tin fluctuates it generally is from 25 to 30 per cent of the value of the tin plate.

In taking up the matter of tin plate purchases, Mr. Feller read clauses in contracts made between the American Can Co., and the American Sheet & Tin Plate Co., and subsequently with the Carnegie-Illinois Steel Corp. Referring to a contract of Sept. 22, 1936, the American Can Co. made with Carnegie-Illinois, Mr. Feller said it provided for a delivered price established on the Carnegie-Illinois officially announced base price plus freight from



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the basing point nearest the point of delivery with a 7½ per cent discount. Mr. Feller made the point that all American Can contracts were made on the Carnegie-Illinois price, and brought out that while Carnegie-Illinois is its largest supplier, American Can also has yearly contracts with the Bethlehem Steel Co., the Republic Steel Corp., the Youngstown Sheet & Tube Co., the Granite City Steel Co. and the Jones & Laughlin Steel Corp.

Mr. Feller asked if since that time the contract had been modified by eliminating the 7½ per cent discount and Dr. Baker replied affirmatively. He would not agree, however, that prices were controlled by Carnegie-Illinois, except to say cans were sold on basis of prices paid the steel company. It was pointed out that while purchases had been made on the Carnegie-Illinois price, adjustments were provided for customers.

Mr. Fairless explained that Carnegie-Illinois sells to other buyers contractually and to some otherwise at the same price it sells to the American Can Co., the country's largest can producer. Replying to a question by Mr. Feller, Mr. Fairless said he was familiar with similar clauses providing for purchase of other steel products at announced prices. Mr. Fairless said that, for example, in the early days he recalled buying semi-finished steel based on THE IRON AGE quotations. He further pointed out tin plate prices are made on a yearly basis whereas on other steel products prices are made for a 90-day period. Tin plate prices, he said, are announced about Dec. 1 and during the year they may be adjusted to a lower basis but never to a higher one.

American Can Changes Contract

Mr. Feller asked Dr. Baker if the American Can Co. had recently changed the form of its customer contracts. Dr. Baker said a change was made early this fall by which his company protects itself on tin plate purchases and makes its own announced prices for invoices at the end of each year. Under the new contract, it was said, the company arrives at a competitive average price paid per pound. To the extent that the price may be less than that prevailing on Jan. 1, it was stated, refund is made to American Can customers, less 10c. per box. By this contract, Dr. Baker said, customers are protected if prices go up. Asked why the change had been made, Dr. Baker said it was due to fluctuations of tin plate price in 1938. American Can prices, it was stated, accurately reflected tin plate prices

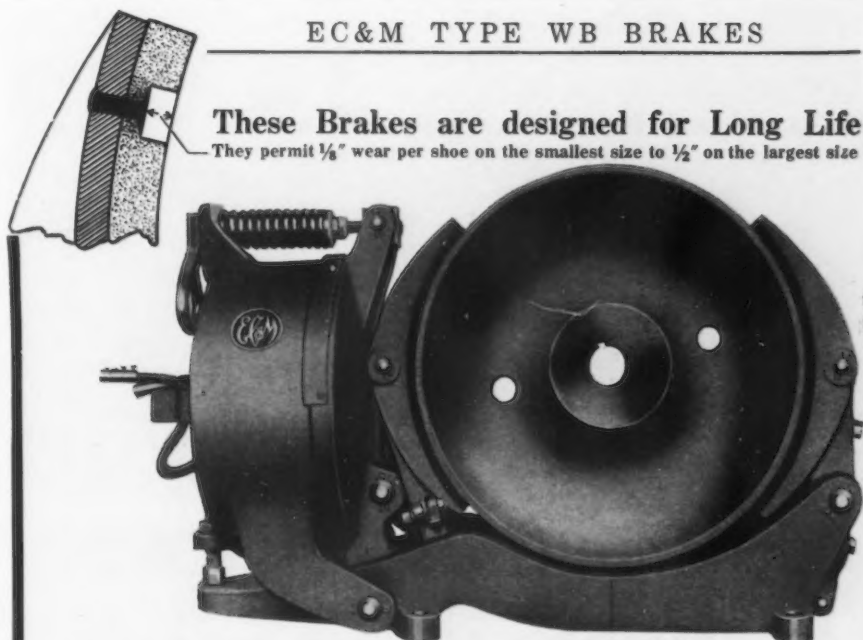
throughout 1938 and the company voluntarily made adjustments with its customers. Dr. Baker said that excess tin plate capacity has tended to produce an unstable market and American Can decided to make its own announced price of tin plate rather than to use the Carnegie-Illinois officially announced price.

Mr. Henderson inquired of Dr. Baker whether general discussions of price policy and deliberations of the committee had anything to do with the adoption of a new contract. Mr.

Henderson said he had heard that was so.

Dr. Baker replied that he had a private conversation with Mr. Feller on the subject and gave Mr. Feller permission to read a transcript of the conversation. In it Dr. Baker said the American Can Co. wanted to take advantage of the price situation in order to benefit customers and did not want a rigid price arrangement. Mr. Feller volunteered that his personal reaction to the statement was that the new contract was better than the old one. Dr.

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Baker replied the American Can customers felt that way about it, too.

Details of Carnegie-Illinois Suit Against American Can Revealed

Referring to the controversy in 1936 over the price of tin plate to be sold by Carnegie-Illinois to the American Can Co., in which Carnegie-Illinois contended that a 7½ per cent discount off its posted price was the maximum it would give while American Can sought an additional 7½ per cent, Mr.

Feller put into the record a letter written by Mr. Hughes to W. A. Irvin, who was then president of the Steel corporation. At that time Mr. Hughes was assistant to the president. The letter, written on June 5, 1936, set forth two courses of action with respect to the matter; (1) stand on its contract and fight the case in court or (2) revise its contract immediately giving an additional discount beyond the 7½ per cent. The letter noted that if the second course was followed the

company would be confronted with a charge of collusion by the Federal Trade Commission or from other Government agencies.

Mr. Hughes explained that if the additional discount had been permitted the company might have been "stood up" under the Robinson-Patman bill, which was then pending before Congress.

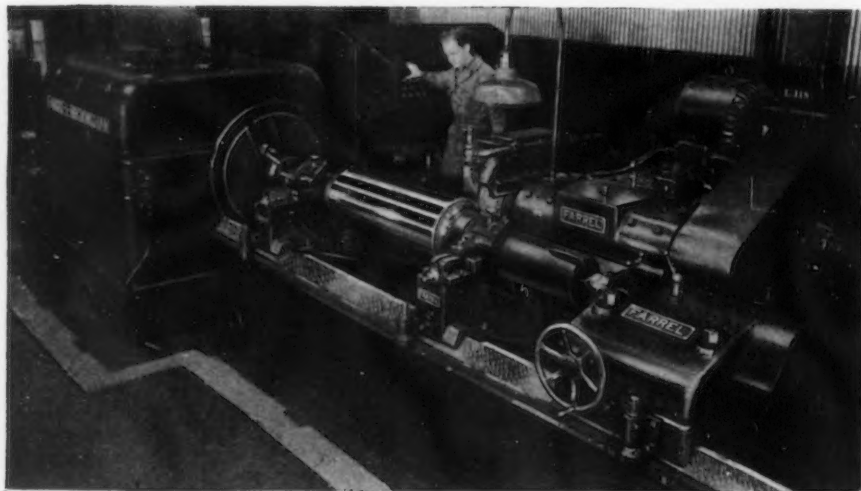
The outcome of the controversy, as developed by the testimony, was that American Can filed a suit against Carnegie-Illinois in which it sought \$7,000,000 damages, the figure which it thought represented the amount owed by Carnegie-Illinois. The case was finally settled out of court, however, and Carnegie-Illinois paid the American Can Co. \$2,250,000, according to the testimony.

Mr. Feller sought to emphasize that the settlement of the suit represented a saving in cost of tin plate but Mr. Pfeltz told the committee that he didn't conceive at that time that it was necessary to pass it on to customers.

Mr. Feller related that in going over the books of the American Can Co., the Department of Justice's investigators had found that there were various accounts with sellers of tin plate whose names were not revealed on the books. Asked about this situation, Mr. Pfeltz replied that he was not an accountant but that the first he had known about the matter was when a representative of the Justice Department "told us about them."

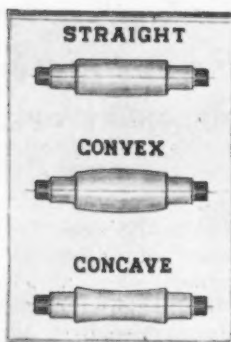
At this point Mr. Feller called to the stand Hyman B. Ritchin, a member of the Justice Department's staff, who testified that he had examined the books of the company and, with the assistance of the comptroller, had found several accounts with the names of steel companies but that Carnegie-Illinois business was identified as "secretary number 1" and Bethlehem's steel business as "secretary number 2." Mr. Ritchin told the committee that the comptroller explained to him that it represented a practice which had been started back in 1900 and had been continued because the company "had never got around to change the names."

In 1912, Mr. Feller recalled at this point, the Department of Justice proceeded against American Can Co. in a Maryland district court and that a decision in 1916 had cited preferential rebates received from tin plate contracts between 1902 and 1903 amounting to \$9,000,000. The court said, Mr. Feller continued, that precautions had been taken to conceal the facts from officers of the company. Questioned



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by Mr. Feller, if in view of this statement he was not aware of the practice, Mr. Pfeltz responded that he could not shed further light on the situation.

"I have no knowledge as to why we didn't have seven or eight secretaries," Mr. Pfeltz said. "It makes no difference so far as I can recall."

Carnegie-Illinois Determines Price

After introducing a letter written by Mr. Pfeltz in which he referred in general terms to a conference by leading steel officials regarding the price of tin plate for 1938, Mr. Pfeltz said that it represented the information he would ordinarily gather in the course of his business but that he could not recall where he got the information. He said that so far as he knew Carnegie-Illinois determined the price on tin plate and that it was not his impression that members of the industry get together and determine price.

Mr. Fairless, asking that he be permitted to clarify any misunderstanding that might have been conveyed by the introduction of the letter, related the circumstances leading up to the announcement of tin plate prices for 1939. The gist of his statement was that the price had been arrived at by negotiations between his company and American Can and "not by any meeting of the tin plate industry."

Mr. Fairless further testified that such an important matter covering a nine-month contractual period inevitably creates a lot of interest while price negotiations are pending.

"Everybody is interested in our price of tin plate," Mr. Fairless said, "and along about November each year I don't believe I have met a manufacturer of tin plate who doesn't ask me if I have made a decision. If I haven't, I say no and if I say yes, an announcement follows."

He told the committee that after consideration is given to the fact that Carnegie-Illinois is the largest manufacturer of tin plate and that American Can is the largest buyer it is not difficult to understand that the resultant price represents a very fair one, recalling that when he was connected with other companies in the industry he was always "happy" when price negotiations between Carnegie-Illinois and American Can were determined.

Mr. Henderson observed that this policy apparently results in the largest producer "holding an umbrella over the other producers by posting a price and adhering to it."

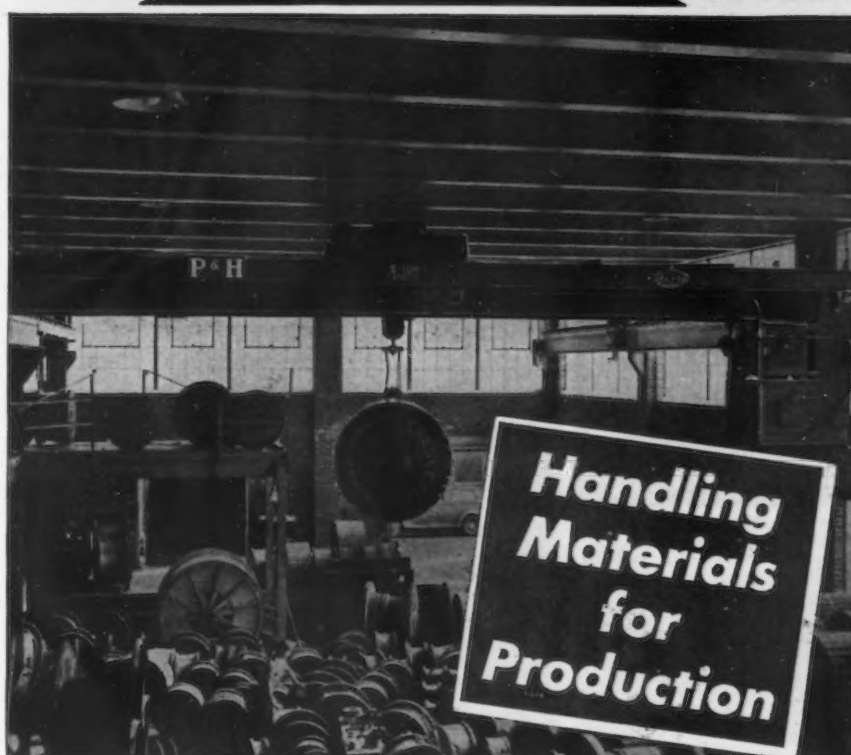
Mr. Fairless agreed that the practice "certainly amounts to fixing a ceiling unless unusual conditions are encountered."

Tin Plate a Profitable Operation

Mr. Fairless informed the committee that when the new Irvin works at Pittsburgh was constructed his company contemplated the closing down of six individual plants after the new operations started. It so happens,

however, he continued, that as a result of the great demand for tin plate the company has put back four of these six plants as a temporary measure. He said that the company's reserve for obsolescence and depreciation amounted to \$270,000,000 in 1935, principally because of improvements in manufacturing facilities. He pointed out, in response to further questioning, that producing tin plate is one of the most profitable operations in the steel industry during depressions. He char-

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Where you repeat the process of handling materials in production, it is frequently possible to reduce costs substantially by using a P&H Trav-Lift Crane. Designed for moderate service, these low-cost installations are saving money in many types of work. Bulletin H-13 describes them; gives complete engineering data on all sizes and types from 1 to 15 tons capacity. Ask for your copy. Harnischfeger Corporation, 4401 W. National Avenue, Milwaukee, Wis.

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acterized it as one of the "most consistent performers," explaining that to that extent it is more profitable.

Feels Responsibility to Labor

Shortly before leaving the stand Mr. Fairless called the committee's attention to the fact that his company feels keenly the responsibilities of its 235,000 workers and that by spreading the work in poor years has been able to keep an approximate average of 60,000 men employed "beyond the strict needs of the business available."

"While we sincerely desire to provide constant and regular employment for our employees," Mr. Fairless asserted, "I cannot recommend following any untried theory in this important and complex business in attempting to accomplish this result. I have to move cautiously, taking into consideration all of the basic factors of the steel industry and seeking all the help and advice I can get from the experienced men around me.

"We have spent our business lives in the industry and I think are fully

qualified to deal with the problems of the United States Steel Corp."

Nathan L. Miller Interprets Legal Aspects of Pricing

Nathan L. Miller, general counsel of the Steel corporation, volunteered the introduction of an opinion he had given to the president of the corporation in June, 1932. He recalled that in April of that year, when Mr. Irvin became president, he had asked Mr. Miller to write an opinion for the guidance of officials of the company as to what the laws permitted and what they prohibited.

Describing these laws as "not so confusing as most people suppose," Mr. Miller said that his opinion was divided into two parts: one covering relation with competitors; the other, sales methods.

His opinion pointed out that reliance "must be placed upon enlightened self-interest, not upon any form of concerted action or understanding, express or implied." To illustrate this point, Mr. Miller said in his memorandum of June, 1932:

"It is permissible to inform competitors of one's prices in the past. It is not permissible to state what the future prices are going to be, because that necessarily involves the obligation, either moral or otherwise, to charge the prices named. It is permissible to call attention to the demoralization resulting from price-cutting. It is not permissible by any sort of concerted action to use coercive measures, promises or threats to influence a competitor not to cut prices.

"The periodic exchange of information on capacity, sales, prices and the like will naturally tend to stabilization, but that is permissible since it is the result solely of enlightened self-interest. It ceases to be permissible only when there is introduced some element of agreement, 'gentlemen's' or otherwise, or of concert of action designed to coerce or restrain free and independent action."

In expressing the view that present anti-trust laws are "neither indefinite nor difficult to interpret," Mr. Miller said that his remarks excluded the Robinson-Patman act.

Accepting the written opinion from Mr. Miller, Mr. Feller expressed the hope that when the TNEC considers the subject of anti-trust laws and what they mean it take into consideration this "excellent" interpretation.

Please see page 101C for further developments at TNEC hearings.

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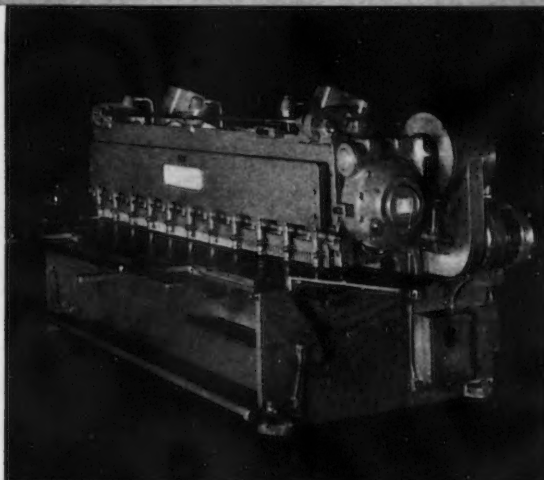
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1 This welded shear is strong, rigid, precise—and looks it. Flawless, well-shaped welds play their part. Photo: Cincinnati Shaper Co., Cincinnati, Ohio.



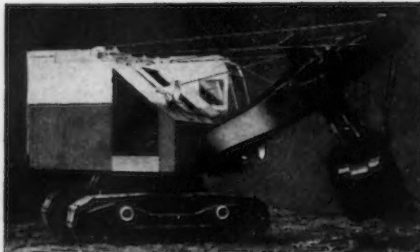
2 Murex welded seams in this heat exchanger suggest careful fabrication. Photo: Struthers-Wells, Warren, Pa.



3 Smooth, clean Murex deposits make welded parts neat and trim. Photo: The Dorr Company, Denver, Colo.



4 Good proportions of this mill drive suggest strength. Well-formed Murex welds help. Photo: Farrell-Birmingham Company, Ansonia, Conn.



5 Ruggedness is apparent in this tunnel type shovel. Welds, too, look sound and strong. Photo: Marion Steam Shovel Company, Marion, Ohio.

Additional Letters from Steel Users On the Question of Inventories

IN THE IRON AGE of Nov. 9, page 79-A, there appeared a number of letters from steel consumers on the subject of steel inventories. In the main these letters pointed out that there is no immediate danger of the building up of excessive inventories. A contrary view is held by an important manufacturer in the automobile industry, whose letter among others appears below. Automobile and parts manufacturers will be obliged to take in by the end of the year much of the steel for which they placed orders in September and prior to that time.

o o o

Steel Equipment Manufacturer

At the present time we do not have an excessive inventory but owing to mill conditions and the fact that many sheet mills are filled up through January and February of next year, it is necessary that we place orders at this time to protect our production for the first quarter of 1940, and our company, like many other companies, finds it impossible to specify, in all cases, the exact sizes and gages of steel required.

We are, therefore, placing orders based on our anticipated requirements, but no doubt in a few months from now we will have surpluses or excessive stocks in some sizes and not enough of certain sizes to meet our production requirements, thereby causing new purchases even with some excess steel inventory.

The longer present conditions exist necessitating placing orders several months in advance of requirements, the more pronounced this condition should be.

■ ■

Marine Hardware Manufacturer

About four weeks ago we placed an order to take care of our normal supply for approximately six months. Part of this steel has been received by us; the balance is drifting along to us daily, and under the existing conditions today we think it is very doubtful if this quantity of steel which we ordered will last us more than four months instead of six, which we planned for.

■ ■

Large Stampings Company

It has been the practice of this company for some time to buy steel only when we have an order for stampings which will consume that steel. We have not and do not expect to deviate from this policy.

From time to time, some dead stock is built up due to the fact that the steel mills sometimes ship steel which will not make the part. Rather than have it sent back to them, they sell it to us at a reduced price. We hold it in the hope of being able to use it for something else. Recently we have sold all this stock to advantage.

Accordingly you will see that there seems to be no chance of this company building up an excess inventory.

■ ■

Builders' Hardware Manufacturer

Our business has not experienced the tremendous improvement that has applied to some other lines because, being manufacturers of builders' hardware, our operations are closely identified with the progress made in building construction.

OBSOLETE EQUIPMENT Helps Your Dollars Get Away



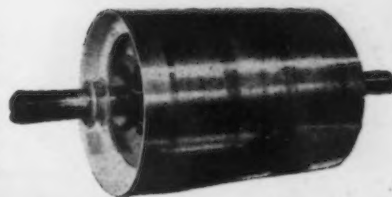
Dollars going up in smoke. Not a pleasant picture to contemplate. Yet that's what many plant executives with obsolete machinery are facing.

If there ever was a time for replacing obsolete equipment it is right now. Many old time magnetic separators, for instance, are carrying heavy overloads, are inefficient by reason of their obsolescent condition... others are inadequate because production has been stepped up with no additional magnets.

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Obsolete enclosed magnetic pulleys like the one at the right will never give you the maximum peak load powerful and continued efficiency of the Stearns improved, fully ventilated and cool pulley, above. Made in sizes to fit your conveying system or in short belt separator units.



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Building construction has not forged ahead to the extent that it should over the past several years due in large measure to the tremendously high costs on the part of labor.

We do not anticipate any profound expansion in building construction; consequently, we are not reaching extensively in our material commitments or our manufacturing.

Based on our observations it is our feeling that the tremendous purchases now being made for steel are not necessarily due primarily to the building up of heavy inventories by the primary users, but we do believe that excessive inventories are planned farther down the line that are bound to cause some congestion and a back-lash later on that will be very disturbing to business. It is a rather woeful situation that there is such a lack of balance in the business structure in this country. Balance in business is due to mental equilibrium; the lack of balance due to the absence of it.

■ ■

Maker of Steel Office Equipment

This company very definitely is not concerned over an excess of steel in our inventory. We have considerable tonnage on the books at the moment. This was placed partly because we know we are going to enjoy an increased volume of business over the next few months and partly to get on the steel companies' rolling schedules. If there is no immediate let-up in business, we will be back in the market in the next several days for additional tonnage.

■ ■

Maker of Enameled Ware

It has been the policy of our company at all times to carry an inventory to cover what we consider normal requirements. We have not deviated from this policy the present year and it is not our purpose to do so. There are times, however, when we might overanticipate somewhat, feeling business would be better one quarter over another, but notwithstanding our inventory covering steel and other supplies is what we consider on a strictly normal basis.

■ ■

A Large New England Company

We are very definitely trying not to become overstocked on steel and think we are succeeding. Our inventories are larger than they were two months ago but so is our consumption which means that our inventory relative to our use, has not increased.

Another practice which is common these days and almost necessary is to order much further in advance of needs than before Sept. 1 and this large ordering program has probably resulted in the belief on the part of many individuals that inventories are being built up. I think that a study of this ordering would

indicate that buyers are scheduling stocks to come in so that they will not run out and also so that they will not build up a big inventory.

We know of a few instances where certain concerns have definitely increased the stock of steel that they ordinarily cover beyond their increased use but they are the exceptions.

■ ■

Farm Machinery Manufacturer

It has been the policy of this company for many years not to speculate by retarding or accelerating schedules to take advantage of declining or advancing markets. We try as nearly as possible to order only that we may receive a continuous flow of raw materials so that we may produce in the most economical manner, both as to material and labor. The only variations to the above may occur when mills are congested and we advance our deliveries from 30 to 60 days to protect ourselves.

■ ■

A Large Stamping Company

Our inventories are very low and we shall endeavor to keep them so. We do not believe that the steel companies are going to attempt to take advantage of the present situation by increasing prices. No doubt certain people are endeavoring to stock up but we believe that the mills are watching this closely and are making a very honest effort to not permit profiteering.

■ ■

An Ohio Manufacturer

Naturally it is quite difficult at the present time to secure shipments for delivery during the balance of this year. While we are not overstocking we are placing commitments to cover our requirements for the next six months.

■ ■

A Michigan Manufacturer

I think that the policy adopted by this company is more or less prevalent among all steel consumers, that is—to keep a nominal supply rolling and to keep a nominal supply on the books of the steel companies. I do not believe that anyone is carrying an excessive amount of inventory.

■ ■

An Illinois Manufacturer

Our policy has been to endeavor to follow a middle of the road course, but as deliveries are further extended, it is necessary that we order much further in advance than we have done for a considerable length of time, which naturally means that at least a certain per cent of the tonnage is more or less of a guess so far as our actual requirements are concerned. To sum the whole matter up, we do not feel that there is any immediate danger of an excess of steel



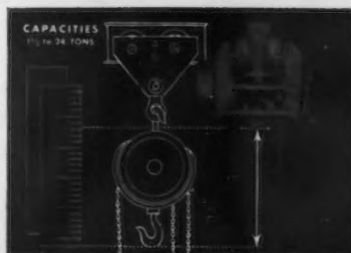
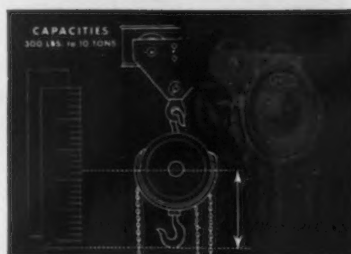
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inventories assuming that the present conditions continue for a reasonable length of time.

A Large Boiler Works

We are not building up an excessive inventory to the point where it would be burdensome should peace be declared even before the end of the year.

A New England Manufacturer

I do not believe that there is danger of excess steel inventories, assuming the continuance for some time of the present

war condition, which is answering all in one short sentence a very debatable subject; namely, "Is the war going to continue for some time?" If there is to be a long war, I do not believe it will be much more than five or six months before all industries will be behind instead of ahead on steel inventories. If, on the other hand, we turn to the thought of a short war—and somebody pushes the button and were to turn this off tomorrow—I would guess that inventories would prove to be pretty high.

With the sound business people that I have talked to, I don't think any one of them have done more than to try to see to it that they have some coverage

that will get them safely started into 1940—say for three or four months—at which time they felt that they would have to take their chances of further continuance.

Manufacturer of Springs

It is certainly the feeling here that there is no immediate danger of an excess of steel inventories, provided of course, that business continues at the present level for some time to come. Our business is excellent and our customers will take our material just as fast as we can possibly get it out, showing that there is an immediate turnover of the finished product. We make no finished product as such. Everything we make goes into something else. On the other hand, should business take a sudden drop and we were faced with hold-ups and cancellations, we could very easily be caught with a considerable inventory of raw material on hand. But as it is difficult to get it in as fast as we are able to turn it out we are not too far ahead as far as our own inventory is concerned.

Electrical Manufacturer

We have not, nor do we contemplate creating excessive inventories.

Metal Furniture Manufacturer

We are not building up excessive inventories as compared with the present amount of business which we are doing. Naturally, in order to protect ourselves for delivery, we have gone out a little bit further than normal conditions would require in the past few years.

Bolt Manufacturer

Our steel purchases have not been for the purpose of increasing our inventory. They have been due to an increase in demand for our product. In fact the demand has been so great that our inventory is below our normal requirements at the present time. Therefore assuming that business continues at the present rate we will have no opportunity to increase our inventory. We might mention we have no intention of increasing our steel inventory beyond our normal requirements.

Automobile Parts Manufacturer

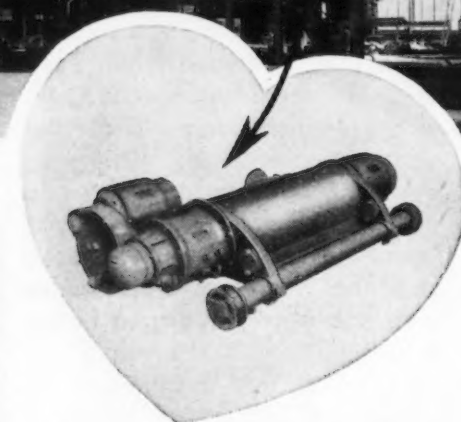
There is no question but what at the present time the automobile industry is building large inventories. Through their releases during the current quarter, the intention is to provide for requirements approximately to April 1. If the steel mills are able to take care of all of the releases now in their hands, inventory Jan. 1 will be large. They will be re-

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duced, however, in proportion to the failure of the steel companies to take care of the large demand made upon them. If the companies allied to the automobile industry are able to secure all of the steel released, the buying in the first quarter will be very light.

Manufacturer of Tools

We are trying to keep in stock a supply equivalent to three months consumption, which, of course, would not cover us for that length of time, because of the impossibility of anticipating the exact size and shape that we may need to fill our orders. I would say that we are a long way from being overstocked.

Manufacturer of Heavy Machinery

A very careful survey of our local conditions indicates the fact that we are not building up any excessive inventories of steel, merely following out the usual practice of supplying our demands as they may develop.

A Railroad Equipment Company

We do not expect to have any excess in steel inventories. Our management is opposed to speculative buying that may help create any false impression about the actual use of steel purchased. We have, however, found it necessary, due to the long deliveries now being made, to purchase steel to cover our requirements for a longer period than usual.

Electrical Equipment Manufacturer

Our chief concern has been to obtain enough steel to take care of our current production. We did not endeavor to anticipate requirements into the future, and, consequently, did not place orders for inventory purposes. This situation applies to practically all of our factories using items wherein steel is an integral part.

A New England Company

We are not buying any material beyond that required for our actual anticipated requirements and, after talking with several of my friends, I find that they are not building up excessive inventories either.

It is true that we are purchasing about four times as much material as we did last year at this time, which fact is due to our having received large export orders as well as increased orders for domestic units.

I hope and believe that most of the

other manufacturers are only covering their anticipated requirements.

Of course, if conditions, should change suddenly, and large orders should be cancelled, then it is natural to assume that quite heavy inventories would be on hand at a later date.

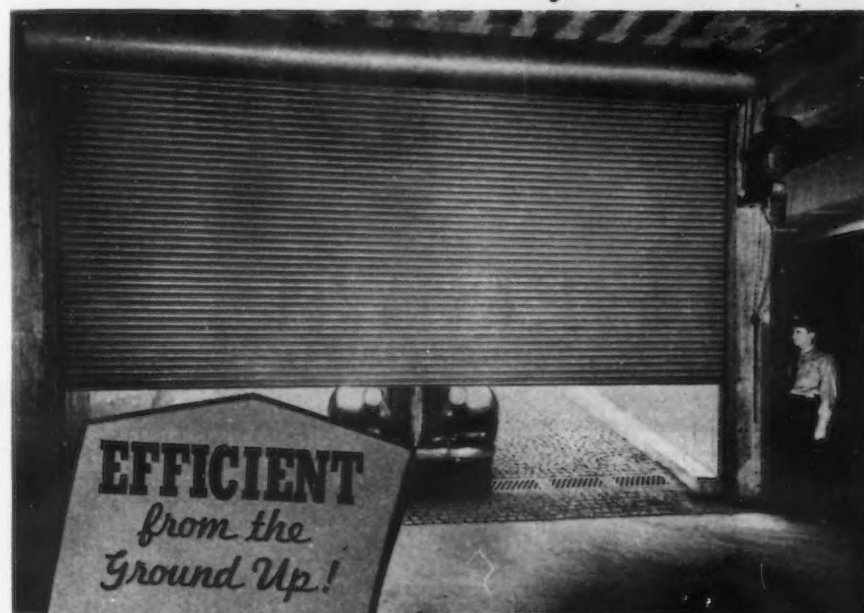
Automotive Equipment Maker

We have purchased very little steel beyond our actual requirements. Whatever has been placed beyond actual requirements has been placed on account

of the time required to obtain delivery. In some instances, we have placed orders to take care of requirements through the first quarter of 1940, but this has been done solely for the purpose of having material in our plant when it is required.

We might say that three or four weeks ago it looked very definitely like there would be quite an advance on all steel commodities around the first of January which, we believe, was the reason for a great deal of tonnage being placed at that time. Indications today, however, are that increases will be very slight, if any, around the first of the year.

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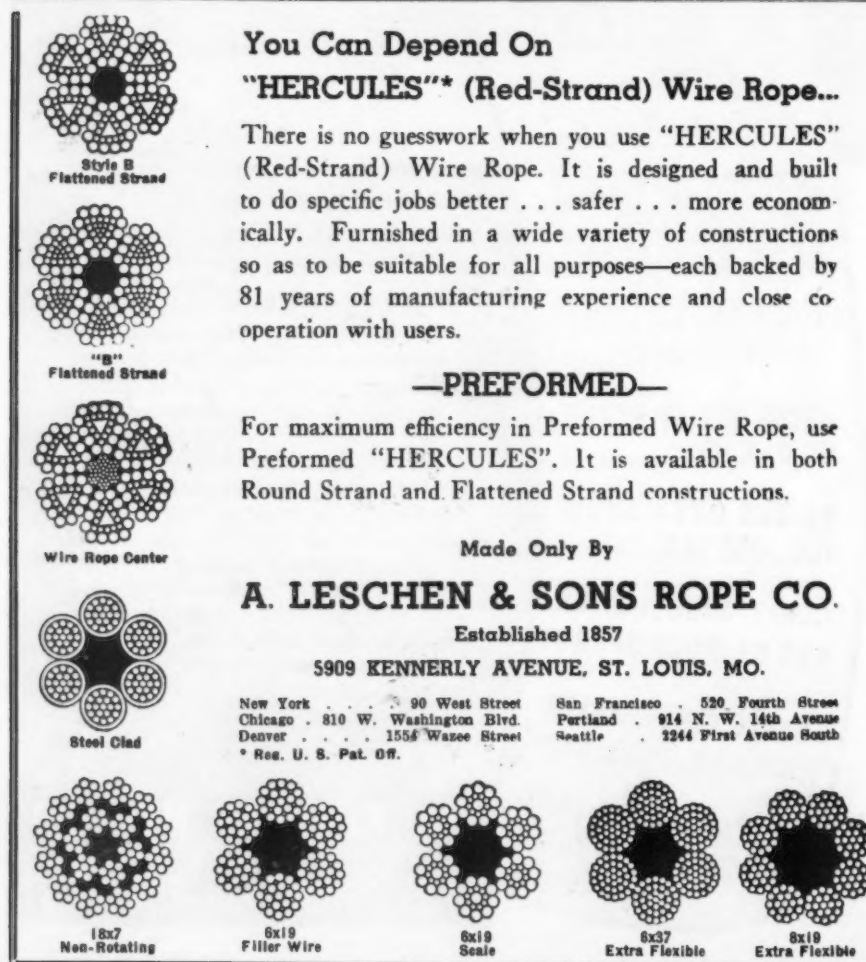
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Wheeling Steel to Rehabilitate Mills

PITTSBURGH — Mesta Machine Co. has been awarded contracts by Wheeling Steel Corp. for the complete rehabilitation of the company's four-high tandem cold mills at the Steubenville, Ohio, plant. Mesta will also furnish two stands of temper pass mills which will be utilized with the existing two single stand temper pass mills at Yorkville, Ohio, thus resulting in twin tandem skin pass mills.

Wheeling's hot strip mill at Steubenville will be widened from 50 to 66 in. and, as mentioned in THE IRON AGE recently, will be modified and modernized to obtain a maximum strip delivery speed. A tandem cold mill at Steubenville will be increased in width from 48 to 66 in.

The rehabilitation program of Wheeling Steel is in line with the general routine practice of keeping sheet and strip rolling equipment abreast with the latest changes in market and production conditions.

Ensley, Ala., Coke Plant May Resume Operations

BIRMINGHAM—Negotiations are now in progress between the Tennessee Coal, Iron & Railroad Co., and the Semet-Solvay Co. for the reopening of the latter's by-product coke plant at Ensley, Ala. The plant is located just across the railroad tracks from the Ensley blast furnaces of the Tennessee Company.

Under the pending proposal, the Tennessee Company will furnish the by-product plant with coal and in return will receive coke and gas. This arrangement has been in operation before. The plant has been closed for several years.

A. F. A. Convention and Exhibits May 4 to 10, 1940

CHICAGO—The 44th annual convention of the American Foundrymen's Association will be held May 4 to 10, 1940, at the International Amphitheatre, Chicago.

All technical and business meetings of the convention will be held in the Amphitheatre, the Stock Yards Inn Hotel, and the Saddle and Sirlain Club. A preview of the exhibits will be held for all interested persons in the Chicago area on Saturday, May 4.

Acid Bessemer Rimming Steel

(CONCLUDED FROM PAGE 53)

trol is important. Other things being equal, a hot blow—possibly due in part to the imperfect removal of silicon—gives rise to "delayed" rimming followed by a vigorous action resulting in a "risen" ingot. A cold blow tends to be too lively in the molds—or even in the ladle if *very* cold.

Turning now to the properties and uses of rimming steel produced by the acid Bessemer process, the authors would reiterate in the first place that the oxide content is comparatively low and is of the same order as that of similar steel produced by other processes. The nitrogen content is definitely higher than in open hearth steel, as is seen in the graph. It is probably in the nitrogen content that the explanation lies for certain differences in mechanical and other properties of Bessemer compared with open hearth steel. For similar carbon and manganese contents, Bessemer steel has a somewhat higher tensile strength than open hearth steel and, in the higher carbon grades, there is good evidence to show that its wear resistance is superior.

Bessemer steel has gained a high reputation for free machineability. The reaction to cold-work or the work-hardening factor is approximately 10 per cent greater than that of equivalent open hearth steel of similar original hardness, and this fact is taken advantage of (together with its quench-aging properties) in certain directions as, for instance, in the manufacture of upholstery springs. At the same time, there is a large and consistent demand for this type of steel for the manufacture of butt-welded tubes. No doubt the very low carbon which is readily attained and the comparative freedom from small contents of "residual elements" through the use of virgin material contribute to the highly satisfactory weldability of this material.

Acid Bessemer rimming steel is still used in large quantities for sheet bar, railway sleepers, light sections, etc., in England.

The susceptibility to strain-age embrittlement can be controlled in the acid Bessemer process in precisely the same way as it can in any other process. The steel responds to quench-aging more readily than open hearth steel, probably on account of the higher nitrogen content, but here again, by suitable treatment, quench-age embrittlement can be satisfactorily controlled and, if necessary, eliminated.

BASOLIT Pickling Tanks



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BRANCHES IN PRINCIPAL CITIES

Iron and Steel Exports up Sharply in September to 244,933 Tons

EXPORTS of iron and steel products (excluding scrap) in September rose to 244,933 tons from the 185,182 tons exported in August, and a corresponding rise in value to \$15,481,546 from \$13,391,234 the previous month, according to preliminary information just released by the Metals and Minerals Division of the Bureau of Foreign and Domestic Commerce. There were 196,368 tons of iron and steel products, valued at \$11,142,216, exported in September, 1938.

The 1,516,988 tons of iron and steel products exported in the first nine months of 1939 were less than the 1,585,187 tons exported in the same period of 1938. However, in the initial nine months of 1939 the exports were valued at \$111,268,825 while in the same period of 1938 the value was \$105,901,894.

Canada, with a total of 54,270 tons, was by far the leading country purchasing iron and steel products. The most important items in this trade were the 13,170 tons of skelp, 7082 tons of non-alloy "black" steel sheets, 6827 tons of plain shapes, 5484 tons of tin plate, 4913 tons of non-alloy "other" plates, and 3402 tons of non-alloy, hot-rolled strip steel. Japan, in taking 23,453 tons, was next in rank with non-alloy ingots, 11,391 tons, alloy ingots, 7999 tons, and non-alloy "other" steel bars, 1947 tons, the leading items. Kwantung rated third place with a total of 21,440 tons—chief products in this trade being plain shapes, 8313 tons, non-alloy "other" steel bars, 7703 tons, and car axles fitted with wheels, 3279 tons. The two most important items in Sweden's 19,847-ton trade were 11,240 tons of pig iron and 5652 tons of non-alloy "other" plates.

Pig Iron First in Tonnage

Pig iron ranked first, in point of tonnage, in the September trade—its 28,192 tons going principally to Sweden, 11,240 tons; the United Kingdom, 8450 tons; Norway, 4651 tons, and Canada, 2896 tons. The 27,111 tons of tin plate exported was a close second. This material went to many countries, with the more important purchasers being Canada, 5484 tons, Brazil, 2552 tons, the Netherlands, 2076 tons, and the Philippine Islands, 2007 tons. Non-alloy "other" plates came third with 20,268 tons. These were also shipped to many countries, but Sweden, 5652 tons, Canada, 4913

tons, the Netherlands, 2699 tons, Norway, 1280 tons and Finland, 1192 tons, were the chief purchasers. Non-alloy "black" steel sheets followed closely with a trade amounting to 20,171 tons, with Canada taking 7082 tons, Brazil, 1820 tons, Sweden, 1487 tons, Mexico, 1221 tons, and the Netherlands and the United Kingdom each taking 1029 tons. The more important takers of the 19,409 tons of plain structural shapes exported were Kwantung, 8313 tons, Canada, 6827 tons, and Venezuela, 1060 tons.

September Scrap Exports Higher

Exports of scrap from the United States in September increased to 330,680 tons valued at \$5,100,069 from 291,896 tons valued at \$4,399,583 in August. There were 145,090 tons of scrap valued at \$2,051,761 exported in September, 1938.

Japan was still the most important purchaser of this product, taking 178,826 tons. Shipments to the United Kingdom totaled 85,527 tons, while Italy, 29,452 tons, Canada, 18,914 tons, Poland and Danzig, 8919 tons and Fin-

land, 5509 tons, were also important purchasers.

The 330,680-ton September trade included 327,724 tons of iron and steel scrap, 1,637 tons of tin plate scrap (all of which went to Japan), 587 tons of tin plate circles, strips, etc., and 732 tons of waste-waste tin plate.

In the first nine months of this year 2,761,594 tons of scrap, valued at \$40,842,079 have been exported, in comparison with the 2,177,839 tons valued at \$33,796,147 which were exported in 1938.

Imports Slightly Higher

Iron and steel imports (excluding scrap) into the United States in September totaled 26,658 tons valued at \$1,431,318 in comparison with the 24,599 tons valued at \$1,354,288 imported in August, according to figures just released by the Metals and Minerals Division, Bureau of Foreign and Domestic Commerce. In September, 1938, 23,739 tons valued at \$1,332,011 was imported.

Over the first nine months of 1939 there has been 240,964 tons valued at \$14,222,744 imported in comparison with the 174,052 tons valued at \$10,891,844 brought in during the same period of 1938.

Canada was the largest source of supply, sending in 9931 tons of products—mostly spiegeleisen, 8349 tons, and pig iron, 1471 tons. Structural shapes, 1723 tons, other hoops and bands, 1106 tons, and solid or hollow bars, 957 tons made up the bulk of Belgium's 5371-ton trade. Norway's trade of 3674 tons was almost wholly ferromanganese, 3659 tons, while British India's trade of 2700 tons was made up entirely of pig iron.

The most important product imported in point of tonnage was spiegeleisen, 8349 tons—all of which came from Canada. Next in line was pig iron—4176 tons—with British India, 2700 tons, Canada, 1471 tons, and Brazil, five tons, the three sources of supply. The 3702 tons of ferromanganese came from Norway, 3659 tons, and France, 43 tons.

The scrap trade of 3216 tons valued at \$27,314 was slightly lower than the 3729 tons valued at \$32,564 brought in during August. Scrap imports for the first nine months of 1939 amount to 25,083 tons valued at \$249,041, in comparison with 7659 tons valued at \$95,339 imported in the same period of 1938.

September Imports of Iron and Manganese Ores

(In Gross Tons)

	Iron Ore		Manganese Concentrates 35 Per Cent or Over	
	1939	1938	1939	1938
Canada	7,098	310	.....	.....
Cuba	21,000	32,000	2,575	7,149
Chile	135,350	110,350	.....	.....
Spain .....	.....	.....	.....	.....
Norway	7,828	.....	.....	.....
Sweden	7,786	49,364	.....	.....
French Africa .....	.....	.....	.....	.....
Russia .....	.....	.....	10,063	16,106
India .....	.....	.....	12,168	1,729
Brazil .....	.....	.....	5,629	.....
Gold Coast .....	.....	.....	12,299	7,732
Other countries	89	5,008	.....	.....
Total	179,151	188,032	42,734	32,716

United States Imports of Pig Iron by Countries of Origin

(In Gross Tons)

	September		Nine Months End. September	
	1939	1938	1939	1938
United Kingdom .....	.....	.....	.....	42
British India	2,700	102	18,233	11,359
Germany .....	.....	.....	.....	.....
Netherlands .....	.....	6,820	6,473	12,725
Canada	1,471	.....	4,512	1,495
France .....	.....	.....	.....	.....
Belgium .....	.....	.....	.....	.....
Norway .....	.....	.....	.....	3,538
Sweden .....	.....	.....	100	25
Russia .....	.....	.....	.....	.....
All others	5	.....	105	.....
Total	4,176	6,922	29,423	29,184

Iron and Steel Imports (In Gross Tons)

	September		Nine Months Ended September	
	1939	1938	1939	1938
Pig iron	4,176	6,922	29,423	29,184
Sponge iron	53	31	1,275	362
Ferromanganese ¹	3,702	3,837	26,550	11,940
Spiegeleisen	8,349	1,069	27,198	7,051
Ferrosilicon ²	18	1	129	100
Other ferroalloys ³	142	180	1,109	549
Scrap	12	.....	212	1
Pig iron, ferroalloys and scrap	3,216	4,218	25,083	7,659
Steel ingots, blooms, etc.	19,668	16,308	110,979	56,846
Billets, whether solid or hollow	14	158	11	165
Wire rods	1,052	564	7,565	470
Semi-finished steel	1,066	741	7,844	3,582
Concrete reinforcement bars	20	105	2,350	4,217
Hollow steel bars	107	72	1,078	1,015
Merchant steel bars	1,241	1,125	15,264	604
Iron slabs .....	.....	.....	.....	14,053
Iron bars	143	7	578	447
Boiler and other plate (including skelp)	2	24	23	295
Sheets, skelp, and saw plate	80	189	1,378	5,768
Die blocks or blanks, etc. ....	.....	1	80	68
Tin plate, taggers' tin and terne plate	9	4	51	83
Structural shapes	1,936	1,902	37,448	28,691
Sashes and frames .....	.....	.....	5	.....
Sheet piling .....	.....	.....	462	.....
Rails and track material	85	669	4,805	2,884
Welded pipe	117	183	4,380	4,102
Other pipe	220	2,156	25,038	17,364
Cotton ties	804	868	7,126	6,825
Other hoops and bands	1,276	922	15,732	12,559
Barbed wire	1,159	671	14,650	10,257
Round iron and steel wire	185	167	1,789	969
Telegraph and telephone wire .....	.....	1	7	7
Flat wire and steel strips	202	180	2,319	1,855
Wire rope and strand	74	213	1,383	1,587
Other wire	109	49	1,410	1,064
Nails, tacks, and staples	549	739	6,904	5,667
Bolts, nuts, and rivets	7	62	86	156
Horse and mule shoes	17	39	324	339
Rolled and finished steel	8,342	10,348	144,670	116,659
Malleable iron pipe fittings	3	11	115	67
Cast iron pipe and fittings	782	50	1,478	1,121
Castings and forgings	13	499	961	2,801
Total	29,874	27,957	266,047	181,711

¹ Manganese content; ² chrome content; ³ silicon content; ⁴ alloy content.

Iron and Steel Exports (In Gross Tons)

	September		Nine Months Ended September	
	1939	1938	1939	1938
Pig iron	28,192	66,600	71,360	312,507
Ferromanganese and Spiegeleisen	329	1	541	230
Other ferroalloys	462	129	1,778	927
Scrap, iron and steel	327,724	142,625	2,741,334	2,160,263
Scrap, tin plate	2,224	1,857	13,400	12,284
Waste-waste tin plate	732	608	6,860	5,292
Pig iron, ferroalloys and scrap	359,663	211,820	2,835,273	2,491,503
Ingots, blooms, billets, sheet bars	13,283	3,916	77,079	140,652
Ingots, etc., alloy steel, including stainless	8,035	2,054	14,762	7,214
Skelp	13,172	3,469	30,432	13,724
Wire rods	1,829	508	17,615	19,144
Semi-finished steel	36,319	9,947	159,888	180,734
Bars, plain and reinforcing	20,472	8,650	118,652	107,691
Bars, alloy steel	434	887	9,142	3,744
Bars, stainless steel	8	265	235	542
Iron bars	74	184	488	1,084
Plates, plain and fabricated	22,431	10,623	190,244	159,100
Plates, alloy steel	686	24	1,866	2,078
Plates, stainless	9	100	93	243
Sheets, galvanized steel	8,491	6,141	71,100	52,044
Sheets, galvanized iron	427	315	4,364	2,993
Sheets, black, plain steel	20,171	16,367	198,541	141,345
Sheets, alloy steel	242	206	2,593	2,682
Sheets, stainless	72	42	665	1,071
Sheets, black iron	775	676	5,385	5,657
Hoops, bands, strips, plain steel	6,766	5,501	54,843	43,031
Hoops, bands, strip steel alloy	44	59	401	275
Hoops, bands, strip steel, stainless	42	59	722	435
Tin plate and taggers' tin	27,111	12,061	175,499	123,254
Terne plate (incl. long ternes)	590	244	3,458	3,533
Structural shapes, plain material	19,409	5,123	79,927	64,993
Structural material, fabricated	2,568	3,199	24,257	28,312
Sheet piling	1,531	37	6,244	2,588
Tanks, steel	1,121	5,341	18,788	30,540
Steel rails	2,994	13,817	44,824	67,209
Rail fastenings, switches, spikes, etc.	2,489	1,581	12,457	10,193
Boiler tubes	766	736	5,868	6,802
Casing and oil line pipe	8,073	3,355	55,222	57,794
Pipe, black and galv. welded steel	4,307	2,416	28,552	17,332
Pipe, black and galv. welded iron	565	774	5,005	4,220
Plain and galvanized wire	4,707	5,073	38,735	34,260
Barbed wire and woven wire products	5,594	5,019	36,525	25,447
Wire rope and other products	1,360	783	9,368	7,655
Nails and tacks	1,937	2,467	18,374	17,869
Bolts, nuts, rivets and washers except track	757	625	5,952	5,969
Other finished steel	651	158	5,787	2,492
Rolled and finished steel	167,674	112,908	1,234,176	1,034,177
Cast iron pipe and fittings	6,026	3,301	29,006	24,418
Malleable iron screwed fittings	394	239	2,858	2,326
Carwheels and axles	4,457	1,347	22,193	17,253
Castings, iron and steel	347	659	4,015	4,820
Castings, alloy steel, incl. stainless	42	43	1,114	623
Forgings, plain	634	1,142	8,627	6,554
Forgings, alloy steel, incl. stainless	57	52	1,432	308
Castings and forgings	11,957	6,783	69,245	56,312
Total	575,613	341,458	4,278,582	3,763,026

A. B. Purvis to Head British War Purchasing Commission

WASHINGTON—Initial plans to coordinate American war purchases by Great Britain and France were announced last week by the British embassy, which disclosed that the United Kingdom had "decided to set up a central organization to be known as the British Supply Board in Canada and the United States, for the purpose of coordinating purchases in the two countries."

Referring to purchases to be made by France, the embassy said that a later announcement would be made regarding arrangements between the two governments in an effort to eliminate competition between them. It was recalled that during the World War, when the two countries bid against each other, prices on American war supplies and raw materials went up as a result.

"Orders in the United States," the embassy said, "will be placed through a British purchasing commission under the charge of Arthur B. Purvis, who has been appointed director general of purchases."

It was explained that the new board will place orders in Canada through the War Supply Board recently set up there under the chairmanship of Wallace R. Campbell. Both Mr. Campbell and Mr. Purvis will be members of the British Supply Board, which will also include "representatives of the United Kingdom service departments and his majesty's treasury."

Rebuilt Republic Blast Furnace Active

WARREN, OHIO—The rebuilt Republic Steel Corp. blast furnace is now in service. The furnace was blown out Aug. 12 after producing nearly 2,000,000 gross tons of iron on a 1930 lining. The William B. Pollock Co., Youngstown, erected the new stack in less than three months working night and day.

The new furnace is around 106½ ft. tall as compared with 91½ ft., the height of the old furnace. The actual inside height from the center line of the tuyere to the tunnel ring is 98 ft. 10½ in.; hearth is 27 ft. in diameter at the stock line and 30 ft. at the mantle. The bosh is 12 ft. 9 in. high. When running full the furnace will consume about 2500 tons of ore, 1200 tons of coke and 300 tons of limestone a day.

INDUSTRIAL NEWS FROM CANADA

No "Fancy Profits", Says British Buyer

OTTAWA—Col. J. H. M. Greenly, controller-general of the British Supply Board of Canada and the United States, stated that British purchases of war materials in Canada will not mean fancy profits for anybody. He stated, "We intend to place our orders with the most efficient contractors and at reasonable prices. We shall not pay any prices that will mean fancy profits."

There is going to be close coordination in the purchase of British—and possibly all Allied—war supplies on the North American continent. Now that the United States arms embargo has been revoked, allowing belligerents to buy on a cash-and-carry plan, the British Government has been able to put into effect its businesslike scheme to coordinate all its buying activities on this side of the ocean.

Colonel Greenly has given a clear indication of the nature of the first orders to be placed by the board in Canada. The first orders are likely to cover aircraft, ammunition, anti-submarine boats and gun barrels for anti-aircraft guns. Any fear that might have existed in some quarters that Canadian industry might be side-tracked in favor of United States purchases may be set aside definitely, Colonel Greenly stated.

A point that is fairly well established is that Canadian industry will be called upon to manufacture fuselages for airplanes, while the engines would be supplied by Great Britain or the United States. There will be engines on hand to give a thorough test to the planes before shipment, but they will be loaded on boats without engines and these will be installed when they reach England. The manufacture of engines is a long, intricate and highly technical process, and much time would be required to set up the necessary plants in Canada.

It now is assured that within a very short time orders for munitions of various types and for anti-aircraft gun barrels will be placed with Canadian firms. Canadian plants are well equipped to turn out such orders in volume. Colonel Greenly also confirmed earlier reports that orders for anti-submarine vessels of the "whale

catcher" variety, 90 feet in length will be placed, the orders to include the necessary armament. In addition shallow boats of the "mosquito" type will be ordered.

Colonel Greenly further stated that he was convinced that Canada possessed adequate potential resources for Great Britain's full war needs, but not without great industrial expansion. It therefore seems evident that purchases will be made in the United States of supplies and equipment, the production in Canada of which would entail delay.

Canada to Be First Source of Supply

OTTAWA—The British Ministry of Supply announced the establishment by the British Government of a central organization to coordinate purchases in Canada and the United States. Col. J. H. M. Greenly, now here, will be controller-general and chairman of the organization to be known as "The British Supply Board in Canada and the United States." Sir James Rae will be deputy controller-general and vice-chairman. The new board will place orders in Canada through the Canadian War Supply Board, established by the Canadian Government. Orders in the United States will be placed through a British purchasing commission headed by Arthur B. Purvis of Montreal, who has been appointed director general of purchases (United States). Wallace Campbell, chairman of the Canadian War Supply Board and Mr. Purvis will be members of the central organization which also will include representatives of United Kingdom service departments—Navy, Army and Air Force—and the Treasury. The personnel of the present British purchasing mission in Canada will be merged with the new organization.

Announcement also is made that Great Britain and France will coordinate their war purchases in the United States, thus eliminating competition. United States purchases will be limited only to the amount of foreign exchange available for that purpose, the extent to which Canada can supply British needs in raw materials and the duration and proportions of the conflict. British authorities al-

ready have intimated that the United Kingdom will look upon Canada as a first source of supply.

Steel Orders in Good Volume in Canada

TORONTO—Orders for iron and steel materials continue in good volume. Local steel interests state that inquiries are appearing for first quarter delivery but books have not opened for contracts beyond the present year. While price advances are expected, it is not believed that they will cover all products, but on the contrary will be confined to a limited number of specialties for which there is heavy demand. Price revisions, however, will not become effective until books open for 1940 contracts.

Increased construction work on new plants and additions for companies that will participate in war contracts is having a stimulating effect on structural steel and reinforcing bar sales. Structural steel is assured of high operating schedules for some time to come. The automotive industry is furnishing a steady demand for materials, and there also is better call from various other manufacturing concerns. Electrical equipment makers are showing interest in the market.

Inquiries now appearing in the market indicate that booking for the first three months of the year will equal and possibly exceed that closed for the current quarter. Business booked to date has been almost exclusively for peace-time operations, with practically no war contracts awarded. Inquiries also indicate heavy purchases for the future for domestic as well as war needs.

It is reported that some of the larger pig iron melters that covered last quarter needs by contract around the first of September are taking delivery and not making immediate use of the iron but are building up stocks for future needs. This may to some extent affect first quarter contracts, but with heavy purchases of steel overhanging the market for war materials pig iron producers are not expected to have any surplus for some time to come as most of the output will continue in basic and be for the further use of producers. Pig iron prices are showing firmness

with producers quoting foundry iron at \$25.50, base Toronto.

During the past week there was an influx of United States industrial interests into Ottawa seeking war orders, and it is stated that these interests represented practically all lines of war supply production. However, it is understood no contracts have so far been awarded, and it is further stated that the United States orders will be placed through a special board headed by Arthur B. Purvis with headquarters in that country.

Algoma Steel Corp., Sault Ste. Marie, Ont., has been forced to step up operations to a 24-hr. basis. The rail order for the South African Government has been completed, but other business is piling up. The tin plate and sheet mills, which were recently installed at cost of \$2,000,000, are running overtime to take care of demand.

Officials of Canadian Car & Foundry Co., Montreal, announce that orders recently closed for rolling stock for the Canadian National and Canadian Pacific Railways will keep this branch of the company's works at high speed until next May, and additional rolling stock orders may be received from abroad. The company is quoting on rolling stock, etc., received from Empire and other countries, involving upward of \$3,000,000.

Canadian Airplane Plants Expanding Production

TORONTO—Canadian Associated Aircraft, which is controlled by some of the leading industrial interests of Canada and was formed upward of a year ago, now is working on the first order for bombing planes for the British Government, and will be called upon to produce as many of these large machines as it can turn out. On completion of the initial order, said to total \$10,000,000, the company is expected to be in shape for high-speed production. It is stated that the British Government is in the market for 1000 of these big Handley-Page-Hampden bombers.

The six companies interested in Canadian Associated Aircraft, Ltd., are Canadian Vickers, Fairchild Aircraft Co., Canadian Car & Foundry Co., Fleet Aircraft Co., Ottawa Car Mfg. Co., and National Steel Car Co.

Under the original plan, the various companies referred to above would produce the various parts for the airplanes which would be assembled at two plants, one at Malton, Ont., and

the other near Montreal which have been erected at cost of \$1,000,000.

Canada's airplane industry has been showing rapid expansion. In 1937 there were in this country eight plants with invested capital of approximately \$3,000,000 whereas at the end of 1938 there were 13 plants with capital employed of \$8,650,000. This number has been further augmented by new plants established during the current year, and much greater expenditure is planned for the building up of Canada's airplane industry to start immediately and be carried over a number of years, irrespective of the duration of the war.

Large Shell Contracts Expected in Canada

TORONTO—Large shell orders are to be placed in Canada almost immediately for British delivery. National Steel Car Co., Hamilton, Ont., has been producing shells for British Government for some time and during the past week heavy shipments to Britain were reported. This company at present is engaged in enlarging its shell production facilities, which are planned, not alone for the present war emergency, but as a permanent branch of National Steel Car Co.'s productive activities. Dominion Engineering Works, Lachine, Que., which was a big producer of shells in the World War, is expected to handle large contracts for current hostilities and its plant is being put in shape with this object in view.

Britain Buys Canada's Surplus of Lead and Zinc

TORONTO—The Ministry of Supply announced that the British Government has arranged to purchase Canada's entire output of lead and zinc for the duration of the war, after all Canadian domestic demands have been met.

This contract with the British Government for lead and zinc will mean the cutting off of other export markets for these products, and the order is expected to involve exports to Britain of upward of 700,000,000 lb. of the two metals. This estimate is based on export figures for the fiscal year ended March 31, last, when Canada's exports totaled 342,800,800 lb. of lead and 297,917,600 lb. of zinc.

The lead will be supplied by Consolidated Mining & Smelting Co., from

its trail smelter, while zinc will be provided by Consolidated Mining & Smelting Co. and Hudson Bay Mining & Smelting Co., Ltd. Canada produces about \$15,000,000 worth of lead, and \$12,000,000 worth of zinc annually.

Great Britain is Canada's largest customer for both lead and zinc, and of total exports for 1938, 247,901,900 lb. of lead, or 71 per cent, went to Britain while 204,496,600 lb. of zinc, or 68 per cent of all exports went to that country. Canada's second largest customer for lead and zinc for several years has been Japan.

Canadian Shipyards To Build 30 Boats

OTTAWA—Official announcement made here is that Canada's outlay on war account to date totals upward of \$75,000,000 and new contracts are being placed daily. Plans also were announced regarding immediate action in the placing of ship contracts. In this regard ships designed to combat the mine and submarine menace will be constructed in Canada, with practically all shipyards participating.

Canadian Plant Expansion

CANADIAN CARBORUNDUM CO., LTD., Stanley St., Niagara Falls, Ont., has awarded contract to Zimmerman Construction Co., for plant addition to be one story, 48 by 100 ft.

Mrs. J. D. Gray, Water Street South, Galt, Ont., is considering plans for erection of plant for manufacture of airplane parts, etc.

Contracts have been let for erection of airplane hangar at Rockcliffe, Ont., to cost \$100,000 for Dominion Department of National Defence, Ottawa.

Dennison Nickel Mines, Ltd., 217 Bay Street, Toronto, Ont., plans erection of concentrator at Worthington, Ont., to have 250 tons daily capacity.

Canadian National Railways, 355 McGill St., Montreal, Que., will build wheel and coach shop buildings at Pointe St. Charles yards. John Schofield, 355 McGill Street, is architect.

Additional contracts have been awarded in connection with \$375,000 plant addition at 2053 Jeanne d'Arc Street, Montreal, for American Can Co. Anglin-Norcross Corp., 892 Sherbrooke Street, West, has general contract.

Canadian Nut Co., Ltd., Mainland Street, Vancouver, B. C., will rebuild plant at cost of \$75,000.

... THE NEWS IN BRIEF ...

Automobile industry buying farther ahead and accumulating inventories.—Page 63.

Production of automobiles may go little, if any, higher this fall until Chrysler strike is ended.—Page 65.

B. F. Fairless, president of U. S. Steel, and E. G. Grace, president of Bethlehem, in testifying before TNEC, leave question of first quarter prices unanswered. E. T. Weir, Charles R. Hook, Dr. H. A. Baker, A. R. Pfeltz, Harold A. Hughes and others on witnesses stand.—Page 66.

Ensley, Ala., coke plant of the Semet-Solvay Co. may resume operations, having been shut down for years.—Page 90.

Wheeling Steel Corp. awards contracts for rehabilitation of mills at Steubenville; hot strip mill to be widened to 66 in.—Page 90.

American Foundrymen's Association will hold its 1940 convention and exhibition at International Amphitheater at Chicago, May 4 to 10.—Page 90.

Steel exports from U. S. gain sharply during September to 244,933 tons.—Page 92.

A. B. Purvis to head British war purchasing commission.—Page 93.

Rebuilt Republic blast furnace active.—Page 93.

No fancy profits to be made on British purchases of war material in Canada, says British buyer.—Page 94.

Canada to be first source of supply for Great Britain.—Page 94.

Steel orders in Canada still in good volume.—Page 94.

Canadian airplane plants expanding production.—Page 95.

Canadian plant expansion.—Page 95.

Large shell contracts are expected in Canada soon.—Page 95.

Canada's shipyards to build 30 boats.—Page 95.

Great Britain buys Canada's surplus production of lead and zinc.—Page 95.

National Association of Manufacturers and National Industrial Council to hold Congress of American Industry in New York, Dec. 6, 7, 8.—Page 100.

Wide program announced for A.S.M.E. annual meeting at Philadelphia.—Page 100.

Railroads decide on program of more extensive research activities on materials.—Page 100.

Heavy engineering awards boosted by \$10,000,000 contract placed by the Carnegie-Illinois Steel Corp. for rolling mill equipment.—Page 101.

Tax revision recommended to aid capital goods industry.—Page 101.

Government iron and steel awards in week ended Nov. 4 totaled \$1,036,261; machinery contracts \$653,850.—Page 101A.

Ohio Seamless Tube Co. to vote Nov. 27 on a new plan of capital reorganization.—Page 101A.

Lack of skilled labor is being felt in New England.—Page 101A.

Idle plant of Pullman Standard Car Mfg. Co. at Baltimore opened to build 500 steel cars for Brazil.—Page 101A.

Great Britain requires licenses for machinery imports.—Page 101A.

Firth-Sterling Steel Co. pegs tungsten tool steel price at 67c. per lb. for 1940, reporting no shortage of tungsten.—Page 101A.

Pig tin bids to Treasury Department range from 47.74c. to 70c. per lb.—Page 101A.

Revised Neutrality Act releases large aircraft orders from Allies.—Page 101B.

Steel men oppose Government regimentation of industry. . . Charles R. Hook advocates higher prices of sheets and strip to meet rising costs.—Page 101C.

Acme Steel Co., Chicago, to spend \$1,250,000 on mill improvements.—Page 101C.

There is danger that the war may obscure unsolved domestic problems, says T. M. Girdler in speech at "Steel Makers' Dinner" of Cleveland Chamber of Commerce.—Page 110.

Ford Motor Co. now offering chrome plated gage blocks.—Page 110.

Pullman Standard reopens car plant closed two years.—Page 110.

SWOC candidates win in Pennsylvania mill town elections.—Page 111.

Philadelphia court upholds NLRB order requiring Republic to rehire, pay \$7,500,000 to strikers.—Page 111.

Industry in United States reported ignoring buyers in Mexico.—Page 119.

O. Smalley, president of Meehanite Metal Corp., re-elected.—Page 119.

United States Army Ordnance orders total \$70,000,000.—Page 119.

Foreign machine tool orders gain in volume. French are in the lead, buying equipment largely for aircraft manufacture. Domestic sales continue at a high level. Long deliveries shifting market to secondary sellers.—Page 120.

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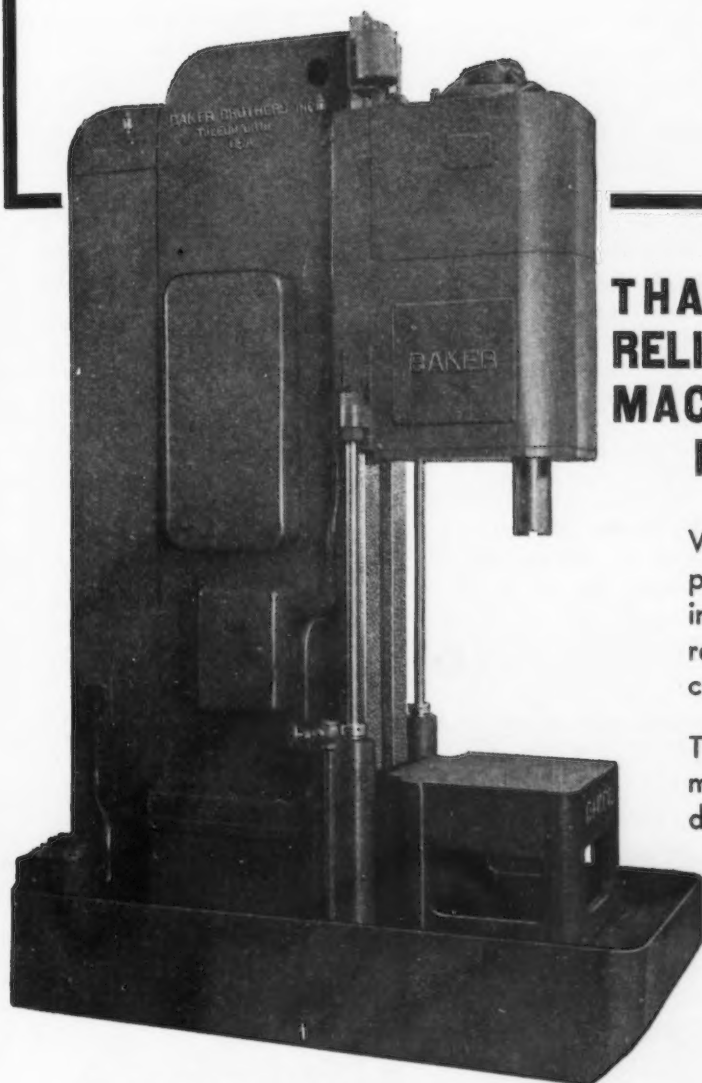
MEETINGS

Nov. 15 and 16—National Founders Association, New York.

Nov. 15 and 16—American Management Association, Chicago.

Dec. 4 to 8—American Society of Mechanical Engineers, Philadelphia.

"HOW WOULD BAKER DO IT?"



Baker Machine No. 30-HO, Single spindle drilling machine with plain table and hydraulic feed.

THAT QUESTION AND BAKER'S RELIABLE ANSWER HAVE REDUCED MACHINING COSTS FOR MANU- FACTURERS EVERYWHERE

When Baker engineering experience tackles a high production machining job—it makes a difference in efficiency and lowers costs. That has been the result on hundreds of problems Baker has been called upon to solve.

The complete line of Baker machines—for light, medium, heavy and extra heavy duty service on drilling, boring, reaming and tapping operations—are engineered and built for high speed and low cost production. There are types that will improve efficiency and economy for you.

Find out how Baker machines will do the job! Send a sample part and ask Baker engineers for their recommendations. Write Baker Brothers, Inc., Toledo, Ohio. New Jersey office, 1060 Broad Street, Newark.

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PERSONALS

IRVIN L. CLYMER has been elected president, Michigan Limestone & Chemical Co., a United States Steel Corp. subsidiary. Mr. Clymer succeeds JOHN G. MUNSON, who was recently elected vice-president, raw materials, United States Steel Corp. of Delaware.

The new president, a graduate of Purdue University, joined the Michigan Limestone & Chemical Co. in 1926 as chief engineer. Prior to that time he had served with the Robins Conveying Belt Co. as draftsman and engineer in connection with the design and installation of handling equipment for coal, coke, ore and limestone. He has been vice-president since 1938.

JOSEPH PENGLASE, who succeeds Mr. Clymer as vice-president, has been connected with the company since 1916 when he began as master mechanic. In 1928 he was made general superintendent, the position which he has held until the present time.

JOSEPH A. SIEGEL, formerly assistant chief tool designer of the Packard Motor Car Co., Detroit, and first president of the American Society of Tool Engineers, has joined the Leland Gifford Co., Worcester, Mass., as sales engineer covering Michigan, northern Ohio and adjacent Indiana territory. He has been active in standardization

work for many years, having served on the American Gage Design Committee, formed in 1926 to work out a gage standardizing program sponsored by the U. S. Bureau of Standards. He also served on a committee on allowances and tolerances for cylindrical fits and gages, sponsored by the American Society of Mechanical Engineers.

HARVEY D. STALNAKER, Pittsburgh, who has been associated with the M. D. Friedman Co., a scrap dealer of Huntington, W. Va., has resigned that connection to devote his entire time to his own company, the Stalnaker Steel Co. of Pittsburgh.

PETER M. HELDT, engineering editor, *Automotive Industries*, Philadelphia, and for more than 40 years a technical writer in the automotive field, was cited as dean of automotive engineering editors at a recent meeting of the Metropolitan (New York) section of the Society of Automotive Engineers. Mr. Heldt became engineering editor of *Automotive Industries* in 1917 shortly preceding the merger of *Horseless Age*, on which he had held various editorial positions, with *The Automobile*, another publication in the same field. In addition to outstanding contributions to technical magazines and S.A.E. meeting programs, Mr.

Heldt is author and publisher of a number of automotive engineering textbooks. He has held offices in the S.A.E., of which he is the 67th member, and has been prominent in reporting the proceedings of the S.A.E. and other societies, notably those of the American Gear Manufacturers Association.

GROVER E. LEVEQUE has been appointed general superintendent, Inter-State Iron Co. and the Jones & Laughlin Ore Co., succeeding the late Mark Elliott, who died Oct. 31. Mr. LeVeque has been connected with the ore interests of the Jones & Laughlin Steel Corp. since 1912. His headquarters will continue to be at Virginia, Minn.

WILLIAM D. CREIDER, for the past 11 years general manager of the Oilgear Co., Milwaukee, has resigned. Previous to that he was sales manager for six years. He has been associated with the machine tool industry as salesman and manufacturer for the past 25 years. Although Mr. Creider is not retiring, he has made no announcement of future plans.

FRANK F. CHILES, formerly with Republic Steel Co., has been appointed general sales manager of the Andrews Steel Co., Covington, Ky.

MASON P. RUMNEY, vice-president of the Detroit Steel Products Co., has



JOHN F. McCOMB (left), whose appointment as sales manager of the merchant trade sheet division of Continental Steel Corp., was announced in these columns last week. A. C. Huber (center), new sales manager of the manufacturer's sheet division, and Hoyt Shepard (right), assistant to the general sales manager.



IRVIN L. CLYMER, new president of the Michigan Limestone & Chemical Co.

been elected mayor of the city of Grosse Pointe, a Detroit suburb. Mr. Rumney already is a member of the city council.

W. L. McGRATH, vice-president of Williamson Heater Co., has been named president of the Industrial Association of Cincinnati. He succeeds GEORGE A. SEYLER.

PROF. HERBERT C. SADLER, for 39 years on the faculty of the University of Michigan College of Engineering, has resigned from the university. The board of regents has conferred on him the titles dean emeritus of the College of Engineering and professor emeritus of naval architecture and marine engineering.

GEORGE W. ROOMNEY has been named manager of the Detroit office of the Automobile Manufacturers' Association. For several years he has represented the Aluminum Wares Association in Washington. JAMES S. MARVIN will retire as assistant general manager and general traffic manager of the Automobile Manufacturers Association. On Jan. 1 he will open offices in New York for consultation on transportation and trade association matters.

WILFRID C. POLKINGHORNE, of the Michigan College of Mining and Technology, and DEAN WELLS I. BENNETT, of the University of Michigan School

of Architecture, have been named to the Michigan State Board of Registration for Architects, Engineers and Surveyors.

C. O. RICHARDS, who has been acting chief body engineer for Cadillac-LaSalle, has been named assistant chief engineer by E. W. SEAHOLM, who is chief engineer. Mr. Richards joined Cadillac as a tool maker in 1909. WILLIAM J. TELL succeeds Mr. Richards as chief body engineer.

I. C. MOREAU has been named assistant to L. S. WOOD, vice-president in charge of engineering of Gar Wood Industries, Inc., Detroit. Mr. Moreau's duties will include engineering work in the company's hoist and body division.

MYRON DIGGIN, chemist of the Hanson-Van Winkle-Munning Co., Matawan, N. J., addressed the Springfield branch of the American Electroplaters' Society on Sept. 25 on the subject of "Semi-Bright Nickel Deposits and the Ductility of Nickel Deposits."

FRANK F. BONNEVIER, who has been identified with the stainless steel foundry plant in Buffalo of Allegheny-Ludlum Steel Co., has joined the supervisory force of the Cooper Alloy Foundry Co., Elizabeth, N. J. C. T. COFFMAN, formerly with the Packard Motor Car Co., Detroit, has also joined Cooper company organization.

V. H. WALLACE, heretofore assistant sales manager of the Caterpillar Tractor Co., San Leandro, Cal., has been appointed Western sales manager, succeeding the late H. H. Chambers.

GEORGE N. TUTTLE, who has served as supervisor of the mill room and process control in the porcelain department of the Frigidaire Division, General Motors Corp., has been made service representative in the Central Ohio territory for Porcelain Enamel & Mfg. Co., Baltimore. He was graduated from Ohio State University in 1930.

EDWARD J. GREENE, formerly purchasing agent and assistant treasurer of the Baldwin-Duckworth Chain Corp., Springfield, Mass., which was recently merged with the Chain Belt Co., Milwaukee, has been elected assistant treasurer of the latter company.



JOSEPH A. SIEGEL, sales engineer for Leland Gifford Co. in Michigan, northern Ohio and adjacent Indiana territory.

A. E. R. PETERKA, technical assistant to the president, Lamson & Sessions Co., Cleveland, has been elected a director of the Dardelet Threadlock Corp., New York, to succeed W. J. DEEGAN, who has resigned.

HAROLD S. FALK, vice-president and works manager of the Falk Corp., Milwaukee, has been appointed chairman of the Volunteer Effort for Wisconsin by Gov. Julius P. Heil. Mr. Falk will lay plans for a civilian recruiting effort in this state, to be exerted in the event of a major emergency. His appointment was at the suggestion of the War Department. Mr. Falk is a civilian aide to the Secretary of War.

HOMER D. SAYRE, commissioner of the National Metal Trades Association, Chicago; L. J. PARRISH, personnel director, A. O. Smith Corp., Milwaukee; and F. H. CLAUSEN, president, Van Brunt Mfg. Co., Horicon, Wis., will be among speakers addressing the annual business session of the Wisconsin Manufacturers' Association Dec. 1, at Hotel Pfister, Milwaukee.

ERNEST P. WECKESSER has been named manager of the Detroit district office of B. F. Goodrich Co. Mr. Weckesser has served as a committee chairman in the Rubber Manufacturers Association.

Wide Program Announced for A.S.M.E. Annual Meeting at Philadelphia

COVERING practically all phases of the field of mechanical engineering, 101 papers are to be presented at 33 simultaneous sessions during the 60th annual meeting of the American Society of Mechanical Engineers, to be held at Philadelphia, Dec. 4 to 8, at the Bellevue-Stratford Hotel. This is the first time an annual meeting of the society has been held outside of New York since 1890. Of chief interest to readers of THE IRON AGE are those papers relating to machine shop practice, iron and steel, education and training and management, the principal ones of which are listed below. There are also to be presented progress reports on aeronautics and railroad mechanical engineering, many papers relating to power plant engineering, fuels, elasticity, photoelasticity, lubrication, rubber and plastics, mechanical springs and industrial instruments.

Monday, Dec. 4

MACHINE SHOP PRACTICE

Building Motion Economy into Machine Tools, by O. W. Habel and G. G. Kearful, Saginaw Steering Gear Division, General Motors Corp.

A New Method of Machine Tool Spindle Analysis, by Thomas Barish, Marlin-Rockwell Corp.

Tuesday, Dec. 5

SCIENTIFIC ANALYSIS OF MANAGERIAL PROBLEMS

The Engineering Method in Management, by Andrew I. Peterson, New York University.

Statistics Applied to Mass Production, by W. A. Shewhart, Bell Telephone Laboratories.

Statistics in the Formulation of Industrial Policy, by K. H. Condit, National Industrial Conference Board.

IRON AND STEEL

The Production of Strip Metal of High-Melting Points Directly from Molten Metal, by C. W. Hazelett, Hazelett Metals, Inc.

Some Designs and Uses of Forged, Heat-Treated and Hardened Steel Rolls in the Steel Industry, by J. R. Adams and H. L. Watson, The Midvale Co.

INDUSTRIAL MARKETING

The Marketing Movement in Mechanical Engineering, by John R. Bangs, Jr., Cornell University.

Gearing Engineering to Sales, by F. B. Heltkamp, American Type Founders Corp.

The Use of Market Research in Introducing New Industrial Products, by Robert Gibson, General Electric Co.

Wednesday, Dec. 6

EDUCATION AND TRAINING

Education and Training of Apprentices for the Aeronautical Industry, by Victor W. Page, consulting engineer.

Apprentice Training, by Ray E. Ellis, General Electric Co.

Apprenticeship in the Machine Tool Industry, by Elmer H. Neff, Brown & Sharpe of New York, Inc.

ADMINISTRATIVE ORGANIZATION

Administrative Organization in Government, by Arthur S. Fleming, U. S. Civil Service Commissioner.

Administrative Organization in Business and Industry, by Lawrence A. Appley, Socony Vacuum Oil Co.

Railroads to Extend Research on Materials

CHICAGO—A program continuing for the coming year a wide range of research activities designed to result in further improvements in railroad locomotive, car and track construction and in methods of operation was adopted by the Association of American Railroads at the annual fall meeting in Chicago, Nov. 10, of the member roads.

Out of this work is expected to come still more powerful, speedier locomotives built without increased weight, lighter weight cars without diminished capacity or strength, better tracks and bridges and scores of other improvements designed to expedite further the movement of freight and passenger traffic with increased safety and promote savings in operating costs.

The program proposes that the railroads continue to study the question of reducing further, by the use of lighter weight metals and through welding instead of the use of rivets, the weight of freight cars of different types without lessening the capacity or strength. A series of road tests to determine what improvements should be made in freight car trucks in order to make possible a still greater increase in freight train speeds has just been completed and a great mass of data dealing with these tests is now being studied so that a report can be issued early in 1940.

The railroads in cooperation with manufacturers, after a series of tests, have just completed the design of a new "tight lock coupler" for use in present-day passenger service. The

coupler is designed more nearly to hold tightly together without "play."

In addition to research work dealing with locomotives, and cars, the program also includes plans for extensive study and experiments looking toward a further improvement in track construction. For some years, the railroads through the Association of American Railroads in conjunction with manufacturers of steel rails, have conducted a thorough study at the University of Illinois into rail construction in order to determine the reasons for defects which cause fissures in the rails. Through this research, it was ascertained that such defects could be largely prevented by controlling the cooling or by "normalizing" steel rails after they have been rolled. As a result, most rails that are now rolled are being treated by one or the other of these processes. This research work is being continued for the purpose of determining the extent to which the life of steel rails can be lengthened by hardening the ends of the rail where most of the wear occurs and determining what other improvements can be made in them. Tests also are being conducted at the University of Illinois to determine the practicability of the continuous welding of rails and the strength of joints welded by different processes.

Experiments also are to be made under the direction of this association relative to the advantages of building up worn ends of rails and switch "frogs" by welding, the advantages that result from using different sizes of rails; the effects on tracks and bridges of the impact of train wheels under varying speeds and loads; improved fastenings for rail; and the control of corrosion of bridges and track.

Manufacturers' Association To Meet in New York Dec. 6-8

THREE thousand industrial leaders representative of the more than 40,000 manufacturers affiliated in the National Association of Manufacturers and the National Industrial Council will participate in the 44th annual Congress of American Industry at the Waldorf-Astoria Hotel, New York, Dec. 6, 7, 8.

Announcing the congress, Howard Coonley, president, said:

"This year we plan a comprehensive analysis of our American system—what it is, how it developed, what are the threats to it, what is its future."

Tax Revision Recommended to Aid Capital Goods Industries

WASHINGTON—Several ways by which Congress through Federal tax revision can help to restore the capital goods industries of the country to a sound basis, opening the door to thousands of jobs for the unemployed and generally improving domestic economic conditions, were suggested to John W. Hanes, Undersecretary of the Treasury, by Machinery and Allied Products Institute of Chicago. The statement was presented by William J. Kelly, president of the institute, in response to a request by Mr. Hanes for suggestions for the consideration of the House of Representatives tax committee which is now studying revision of the present federal tax system.

Mr. Kelly indicated that there is great opportunity through Federal tax revision for sustaining activity in capital goods lines. He said, "The revenue acts have dealt harshly with the capital goods industries. The very industries which have most needed relief and encouragement have been

saddled with disproportionate tax burdens."

As one remedy, he suggested that the present two-year limitation on net loss carryovers should be revived more in line with that accorded the industries in England, where since 1926 a net loss carryover into six subsequent years has been provided. Specifically, Mr. Kelly proposed that Congress extend the present two-year limit to not less than five years, or for such longer period as may be required for industry to recover fully, before taxation, the net losses of prior years.

That the supply of new investment capital for American industrial progress is being badly discouraged by present tax conditions was also emphasized by Mr. Kelly.

"Creation of durable wealth-creating facilities requires long-term rather than short-term financing—securities, stocks, preferred and common, of no maturity, and bonds of long maturity; rather than temporary or short-term bank credit or other forms of commercial credit," he said.

Congress, in any tax revision plans, must also take a more realistic recognition of the obsolescence factor in industrial maintenance, Mr. Kelly declared. In permitting industries to make adequate reserves for depreciation and equipment replacement, tax administration should recognize actual conditions, he pointed out.

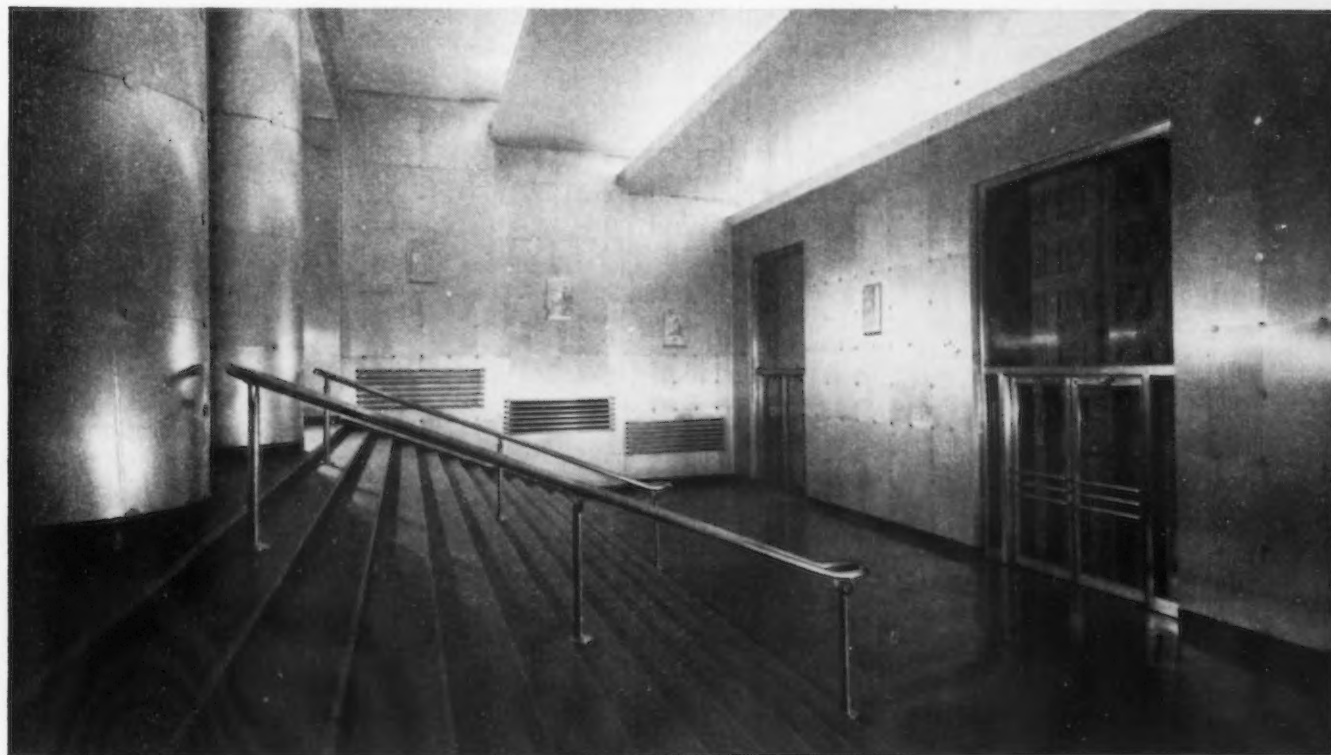
Estate taxes and surtaxes on higher bracket incomes also are hindering industrial progress, he charged.

"If estate taxes and surtaxes on individuals in the higher income brackets are lowered, the result will be a freer flow of risk-bearing capital into employment-making enterprise. Moreover, we believe over-all Federal revenues in consequence will be increased, not reduced," he added.

The predicament of capital goods companies under the combination excess profit-capital stock tax has been especially severe, he also said.

Inequities inherent in the practice of using graduated rates of Federal normal tax for corporations also brought criticism.

Ending of the prohibition against consolidated tax returns for affiliated companies was also recommended.



35,000 lb. of "Ingaclad" stainless-clad steel sheets line the walls and pillars of the entrance foyer, Museum of Science and Industry, Chicago. The buttons in the walls, the railings and the doors all are of bronze.

Government Iron And Steel Awards

WASHINGTON — Government contracts for iron and steel products as reported for the week ended Nov. 4 by the Labor Department's Public Contracts Division totaled \$1,036,261. For the same period, the division reported that contracts for non-ferrous metals and alloys aggregated \$329,965; and for machinery, \$653,850. Details follow:

Iron and Steel Products

Marion Malleable Iron Works, Marion, Ind., TVA, nuts, malleable iron	Indefinite
Midvale Co., Nicetown, Philadelphia, Navy S & A, slides	\$320,200.00
North & Judd Mfg. Co., New Britain, Conn., War Q M C, buckles	12,143.03
United States Pipe & Foundry Co., Philadelphia, Panama Canal, cast-iron pipes	33,454.22
Concrete Steel Co., New York City, War Q M C, reinforcing steel ..	25,184.00
Columbia Steel Co., San Francisco, Interior, reinforcement bars	53,487.18
Columbia Steel Co., San Francisco, Interior, reinforcing bars	184,440.00
Colorado Fuel & Iron Corp., Denver, Interior, reinforcing bars ..	58,632.00
Carnegie-Illinois Steel Corp., Wood works, McKeesport, Pa., Navy S & A, steel, sheet and strips	12,701.80
Lindberg Engineering Co., Chicago, War Ordnance, annealing furnaces	39,968.00
Combustion Engineering Co., Inc., New York, War Engineer, boiler ..	19,947.00
Phoenix Bridge Co., Phoenixville, Pa., WPA, structural steel	12,616.00
Goshin-Birmingham Mfg. Co., Inc., Birmingham, Interior, conduit-liner extensions	128,000.00
National Forge & Ordnance Co., Irvine, Pa., Norfolk Navy Yard, plungers and cylinders	45,425.00
Joseph T. Ryerson & Son, Inc., Chicago, Norfolk Navy Yard, steel ..	10,848.96
Allis-Chalmers Mfg. Co., Milwaukee, War Air Corps, bedplates, dynamometer	15,454.00
The Timken-Roller Bearing Co., Canton, Ohio, War Ordnance, molybdenum steel	10,319.31
Carnegie-Illinois Steel Corp., Pittsburgh, War Ordnance, steel, chromium-molybdenum	18,845.04
National Tube Co., Pittsburgh, Portsmouth Navy Yard, steel flasks	12,705.00
Crucible Steel Co. of America, Park works, Pittsburgh, Portsmouth Navy Yard, steel	21,891.35

Non-Ferrous Metals and Alloys

Aluminum Co. of America, Massena, N. Y., Interior, aluminum conductor	\$44,182.27
Aluminum Co. of America, Pittsburgh, and Massena, N. Y., TVA, electrical conductor	219,497.12
Aluminum Cooking Utensil Co., New Kensington, Pa., Procurement, hospital equipment	Indefinite
Phelps Dodge Refining Corp., New York, Treasury, electrolytic copper ..	12,550.00
Goldberg Brothers, Denver, Interior, annealed copper	35,700.00
Copperweld Steel Co., Glassport, Pa., Panama Canal, wire, copper, bare	18,036.36

Machinery

Ingersoll-Rand Co., Painted Post, N. Y., Panama Canal, air compressors	\$29,628.00
The Leece-Neville Co., Cleveland, Norfolk Navy Yard, diesel engine parts	22,459.65
New Britain-Gridley Machine Division, New Britain Machine Co., New Britain, Conn., War Ordnance, chucking machine	23,130.00
Seneca Falls Machine Co., Seneca Falls, N. Y., War Ordnance, lathes	26,085.40
Henry Prentiss & Co., Inc., New York, War Ordnance, boring mills ..	128,988.00

The Hendey Machine Co., Torrington, Conn., War Ordnance, lathes ..	13,880.00
Leland - Gifford Co., Worcester, Mass., War Ordnance, drill presses	15,643.00
Smith-Courtney Co., Richmond, Va., Navy S & A, lathe, turret	15,859.50
E. W. Bliss Co., Brooklyn, War Ordnance, vertical presses	12,100.00
Lloyd & Arms, Inc., Philadelphia, War Ordnance, engine lathes	23,770.00
Gisholt Machine Co., Madison, Wis., Navy S & A, lathes, turret	13,654.70
E. W. Pike & Co., Elizabeth, N. J., Procurement, moisteners	Indefinite
The Osgood Co., Marion, Ohio, War Engineer, dragline excavator	25,170.00
Thew Shovel Co., Lorain, Ohio, Panama Canal, shovels	158,400.00
E. C. Fuller Co., New York, GPO, case-making machine	13,025.00
Hubbard & Floyd, Inc., New York, WPA, truck crane	13,519.00
American Hoist & Derrick Co., St. Paul, Minn., Panama Canal, derricks	81,247.00
Product Development & Engineering Corp., Cleveland, Navy S & A, towing winch	14,968.00
Jenkins Brothers, Bridgeport, Conn., Navy S & A, valves, globe	22,323.02

Lack of Skilled Labor Is Felt in New England

BOSTON—The New England metal working industry is seriously handicapped by a lack of skilled labor, so much so, in fact, it is doubtful if production can be stepped up noticeably. In certain sections of these states, more particularly in Connecticut and western Massachusetts, it has been necessary for some concerns to turn down new business because of limited production capacity. Such concerns have sufficient business booked to keep plants going at current capacity well into the first quarter.

Boys from trade schools are being hired as quickly as schools are willing to release them as qualified.

Idle Car Plant Reopens To Build for Brazil

THE Curtis Bay plant at Baltimore of the Pullman-Standard Car Mfg. Co., which has been idle since 1936, has been opened to build 500 steel freight cars for Brazil. It is estimated that about 300 men will be given employment. The chances of this plant remaining open after the completion of the Brazilian order depend entirely upon the receipt of further foreign business.

Ohio Seamless Tube to Vote on Reorganization

CLEVELAND — Stockholders of the Ohio Seamless Tube Co. will meet Nov. 27 at Shelby, Ohio, to vote on a new plan of capital reorganization which involves creating a class of stock to be designated as prior preference stock, offering this in exchange

for the present outstanding 7 per cent preferred on the basis of four shares of the new for one of the old and changing the no-par stock to a \$5 par common.

The new prior preference will bear an initial dividend of \$2.68¾ per share or \$10.75 for four shares. Under the plan, 50,000 shares of the new preferred will be authorized, redeemable at \$35 per share plus accrued dividends.

The company reports earnings for the first nine months of this year, before surtax on undistributed profits, at \$95,063. This compares with a loss of \$101,819 for the same period of 1938.

Britain Requires Licenses For Machinery Imports

ACCORDING to the U. S. Department of Commerce, the British Government has promulgated Import Prohibition No. 4, effective on Oct. 24, 1939, requiring import licenses for all classes of industrial and agricultural machinery, plant appliances and parts, components and accessories, including tractors, but excluding airplanes, locomotives, and vehicles other than tractors. Import licenses for machine tools will be issued only to importers on list approved by the controller of machine tools.

The following items of electrical equipment are also subject to import licenses: battery-charging sets, condensers, converters and transformers, electric heating and cooking apparatus, electromedical apparatus, generators and parts, magnetos, meters, motors and parts, electrically driven portable mechanical appliances, starting and controlling gear and parts therefor, telegraph and telephone apparatus.

Canadian Steel Companies To Build Oil Plants

PITTSBURGH—The Algoma Steel Corp., Ltd., has awarded a contract for the construction of a light oil refining plant at Sault Ste. Marie, Ont., to Koppers Co., engineering and construction division. The plant is to be ready for operation at the earliest possible date.

Koppers Co. has also been awarded a contract by the Dominion Steel & Coal Corp., Ltd., for the construction of a light oil refining plant and new by-product recovery equipment, to be erected at Sydney, Nova Scotia.

Revised Neutrality Act Releases Large Plane Orders from Allies

ALTHOUGH official comment is lacking, various estimates of the amount of aircraft business released by the revision of the Neutrality Act have appeared following the creation of the new law. Yet to be shipped on old orders from the French Air Ministry are about 150 North American trainers with Wright Whirlwind engines, 100 Douglas attack bombers with Pratt & Whitney Wasp engines, 215 Martin bombers with P. & W. engines and 20 Vought-Sikorsky dive bombers.

Uncompleted orders for Great Britain include 130 Lockheed bombers with Wright engines and as many North American trainers with P. & W. engines, besides 15 planes for Canada and 50 Lockheed trainers for Australia. Of these totals, there have been completed since Sept. 1 about 300 ships, many of which are now at Eastern seaboard awaiting shipment. Some, it is said, will be flown across to England from Newfoundland air bases.

On Nov. 3 it was reported in newspapers that six aviation companies had received Allied orders on that day, but elsewhere it was learned that such orders had been on hand some time, but had been kept under cover for obvious reasons. The new business is estimated as follows: United Aircraft Corp., \$70,000,000 worth of Pratt & Whitney engines and Hamilton Standard propellers; Curtiss-Wright Corp., \$50,000,000 worth of P-36 pursuit planes and Wright Whirlwind engines; Douglas Aircraft Corp., \$30,000,000 worth of attack bombers; Glenn L. Martin Co., \$16,000,000 worth of bombers; the Lockheed Aircraft Corp., \$5,000,000 worth of reconnaissance bombers, and the Republic Aircraft Corp., \$4,000,000 worth of pursuit planes.

Earlier in the year, France had received the last of the initial order of 200 Curtiss P-36 pursuit ships, said to have proved so highly successful in "dog fights" over the Western front. Both Pratt & Whitney division of United Aircraft Corp. and the Wright Aeronautical Corp. have spent millions for machine tools in recent weeks, and structural awards for new buildings for both companies have been reported in *THE IRON AGE* in the recent past. Three weeks ago Wright Aeronautical Corp. officially announced the construction of a building of 300,000 sq.

ft. of floor space, and it is understood that additional buildings may be erected shortly.

Biggest problem yet to be solved by the aircraft industry is that of personnel rather than plant, however. In 1934, the industry employed about 13,000 persons. Today the entire aircraft industry has about 45,000 employees, and it is estimated that by the spring of 1940 the industry will be employing close to 80,000 persons. In the last five years, most of those hired have been unskilled workers which were trained by the companies. In many instances, young boys fresh out of high school and with a blueprint

Firth-Sterling Pegs Tungsten Tool Steel Price at 67c. for 1940

MCKEESPORT, PA. — Firth-Sterling Steel Co., large producer of high speed and other tool steels, has announced that it will maintain throughout the year 1940 the present 67c. price on standard 18 per cent tungsten high speed steel. Among tool makers, this grade accounts for two-thirds of the total production in high speed steel. This price guarantee, it was pointed out, will apply except in the event that there should be a general wage increase throughout the tool steel industry—in which case only such price increases as would cover the increased labor cost would be considered.

In making this announcement, L. Gerald Firth, president of the company, said the company's action is in line with the Government's effort to stabilize prices on certain strategic materials. "It is our immediate objective," Mr. Firth explained, "to refute disturbing rumors of an imminent price increase in high speed steel. Such fears may be associated with recollections of the sky-rocketing prices on this commodity during the World War when prices quadrupled in a short period. There is now no occasion to repeat such an experience, particularly since we fear no tungsten shortage."

"The present favorable tungsten situation has been brought about largely through Government effort to encourage long range development of the

reading course from the local "Y" their only technical training, have been given employment by plane and engine builders.

The job of training has been made doubly difficult since the aircraft industry has been slow to adopt mass production methods, largely because of the short runs involved. There is still a great deal of hand work in aircraft factories, and in the engine plants the equipment is largely general purpose, requiring much more skill for its operation than do the special purpose, automatic cycle machines so common in the automotive industry where the operator need only load the machine and depress the start button. Wright Aeronautical has been advertising for radial drill and turret lathe operators in New York and local papers for the past month.

American tungsten industry. This in turn makes possible a steady domestic supply of this important metal. In our own case, through the ownership of the Wolf Tongue Mining Co., with tungsten mines in Colorado, we are assured a continuous supply of high grade tungsten ore in sufficient quantity to meet consumer needs.

"With the assurance of adequate domestic raw materials and since the price of tungsten is a principal determinant of the finished tool steel cost, we are able to peg the price—with the proviso that wage rates in the tool steel industry remain at present levels."

Carnegie-Illinois Mill Contract Lifts Week's Building Awards

A \$10,000,000 contract for rolling mill equipment for Carnegie-Illinois Steel Corp. in Mifflin Township, Pa., was instrumental in boosting total private awards made in the past week to \$20,476,000, or 7 per cent above the preceding week, and 258 per cent over a year ago, according to a report by *Engineering News-Record*. Another outstanding award of the week was for a warehouse for General Electric Co. in Chicago, involving \$1,500,000.

Public awards in the past week were \$33,127,000, bringing the total for both classifications to \$53,603,000, as compared with \$50,040,000 in the previous week. The cumulative total of awards, both private and public, for the year to date is \$2,613,957,000, or 11 per cent over the comparable period of 1938.

Steel Men Oppose Government Control; C. R. Hook Advocates Higher Prices

By L. W. MOFFETT,
Washington Editor, *The Iron Age*

NOTE:—*Reports of other testimony before the Temporary National Economic Committee begin on page 66*

WASHINGTON—Vigorous opposition to Government regimentation of the steel industry was pointedly emphasized as one of the most important phases of the Department of Justice's inquiry into the industry before the Temporary National Economic Committee. Heads of the largest and the next to largest steel units took particular occasion to tell the committee that the industry itself is best fitted to solve its own problems.

Charles R. Hook, president of the American Rolling Mill Co., while opposing Government regimentation, did advocate Government approval of a wider sphere for consultation in industry respecting costs and prices, suggesting that the Department of Justice or some other Government body advise in advance just how far such cooperation could proceed. He said he did not favor price fixing. This proposal was made after Mr. Hook had dwelt on the encouragement the English Government gives business, though he said he realized the improbability and opposed the idea of the United States Government permitting price fixing. He also said he was not recommending any change in the anti-trust laws. Mr. Hook was the first witness to go flatly on record respecting first quarter prices. He said there should be increases in prices on sheets—and in a subsequent interview said he meant to include strip also—to offset rising costs of raw materials. Flat rolled products constitute the chief volume of Armco's output.

Completion of the present hearings, which relate to price policy and exports, is expected the latter part of the current week. The steel hearings will be brought to an end in January when United States Steel Corp. officials will be asked to testify on costs and the basing point system. The entire committee will conduct the inquiry on costs while the Federal Trade

Commission will have charge of the basing point quiz. The Steel corporation has prepared exhaustive data on both subjects.

Favors Higher Prices

Just before he concluded his testimony on Monday, Mr. Hook went directly on record in favor of increased first quarter prices on flat rolled products. While in his testimony he confined his remarks to a price increase on sheets, he later told press correspondents that there should be an increase on strip as well. Pointing out that his company's production consists largely of flat rolled products, he declined to comment on the question of price increases on a general line of steel products.

Mr. Hook's observations about first quarter prices were made in connection with the statement Assistant Attorney General Thurman Arnold presented at the opening of the steel hearings. Mr. Arnold expressed the Department of Justice's gratification at the industry's decision not to increase fourth quarter prices, and said he confidently trusted "that the patriotic spirit which prompted the decision will continue to rule the industry's decision in the future."

"In sheets where there is severe competition and prices are low, I hope the industry will not be considered unpatriotic if, in view of the costs of raw materials, prices should be increased to some extent to get returns," said Mr. Hook. "Some of these products are sold below cost."

Discusses British System

Mr. Hook's advocacy of advance Government advice regarding consultation and cooperation in industry was made in connection with a letter he wrote on Sept. 8 of the present year to Assistant Secretary of State A. A. Berle, Jr., in which Mr. Hook pointed out the British Government cooperates with industry with respect to price and allocation of business, affording greater opportunity for employers to cooperate with employee organizations with respect to wages. Protection

against combination of employer and employee organizations, Mr. Hook told Mr. Berle, is given through the operation of the Import Advisory Committee. Mr. Hook said that Armco's business interests in England and association with English manufacturers, together with his recent studies as a member of the Commission appointed by President Roosevelt to investigate industrial relations in England, had impressed him "with the difference in the way we have generally attempted to make changes affecting our industrial system."

He said he was not advocating the British system for the United States, but pointed out that he had mentioned the matter to indicate the many factors that must be studied if the TNEC "is to make a report that will be of real value in helping to create a situation that will encourage and not destroy individual and corporate initiative, and that will raise and not lower the standard of living of the average citizen." Mr. Hook had written to Mr. Berle on the strength of recommendations the latter has made to the committee.

Favors Open Competition

Replying to a question by Joseph J. O'Connell, Jr., of the Treasury Department as to what should be done in the price field, Mr. Hook said he is opposed to industry setting prices and is much in favor of open competition and of adherence to published prices. He said that he thought many associations would not agree with him but that in his opinion it would be advantageous for an industry to file prices with its trade association. They would be maximum prices, Mr. Hook said, and would be maintained until new prices had been filed.

When Mr. Feller asked if he was correct in construing Mr. Hook's letter to Mr. Berle as suggesting that industry get together to discuss what prices ought to be, Mr. Hook replied that he had not made such a suggestion. He said he had suggested that industry be allowed to get together and discuss what a fair price should

be on the basis of costs. In answer to a question by Mr. O'Connell, the steel executive said there probably would be differences of opinion on what should be a fair price based on costs. Mr. Hook said his suggestion related to the "general run of mill" products and not to specialties.

Mr. O'Connell said he would be suspicious of consultation to ascertain what a fair price is, whether the discussion was by industry alone or by industry and Government.

Mr. Hook said that he thought there should be an average cost of the most efficient producers determined without agreement on price and that it would not be against public interest. He explained that American manufacturers realize that lower prices consistent with costs are desirable for both them and their customers.

Management, Mr. Hook said, has a definite obligation to investors to make a return for them. Certainly, he pointed out, the purchasing power of investors has been seriously affected the past few years, a fact that was attributed to the lack of understanding of management regarding costs.

Mr. Hook said industry should earn 10 per cent on common stock, 5 per cent to be reserved for reinvestment and 5 per cent to be distributed to investors.

Cites Fears of Government

Business fear of Government, such as certain provisions of the Securities and Exchange Law, administration of the national labor relations, and competition with private industry was declared to have effected the flow of production and capital during the 1930-38 period, Mr. Hook told Representative Williams.

Mr. Feller challenged Mr. Hook on this point, explaining that the Government bodies named had been in operation during only one-half of the period mentioned.

Mr. Hook, however, pointed out that the depression prior to the first part of 1937 would have ended sooner if it had not been for Government restrictions on management. To indicate the effect confidence will have on business, Mr. Hook spoke of its upswing beginning with May, 1938, following the constructive attitude of the Treasury Department toward the tax structure and appointment of a Congressional committee to investigate the National Labor Relations Board.

Pipe Competition "Intense"

Swinging the discussion to the subject of tubular products, Mr. Feller

turned the Monday afternoon session over to John W. Porter, Justice Department attorney, who introduced in the record a memorandum describing the competition between welded and seamless pipe as having "serious economic implications."

"Since the two are sold at comparable prices, with only a relatively small differential in favor of lapweld, seamless has tended to some extent to replace lapweld in the general oil country market," the Justice Department statement said. "During years of depression this interproduct competition inevitably took sharper flavor. Amid the widespread secret price cutting which followed the unprecedented fall in steel activity late in 1937 and in the first half of 1938, this competition reached its most intense stage."

C. H. Roberts, general sales manager of South Chester Tube Co., testified that there is no control of prices in the industry but, on the contrary, prices are governed "entirely by competition." Base prices are published from time to time, he related, and the practice is to adhere to these published prices as closely as possible.

George W. Whitney, counsel for the South Chester Tube Co., objected to the introduction of a letter through which Mr. Porter was attempting to establish that the company had had price consultations with officials of the Wheeling Steel Corp. in August, 1938. Mr. Whitney's point was that the evidence might incriminate the witnesses and he specifically asked for immunity before Mr. Roberts was allowed to proceed. His request was granted.

Conceding that he had talked with H. E. Schafer, assistant manager of tubular sales, Wheeling Steel Corp., Mr. Roberts told the committee that it is unusual to confer with Wheeling Steel officials but that the situation was so "demoralized" at that time "we were wondering how we could continue in business." His purpose in talking with Mr. Schafer was merely to ask whether Wheeling Steel had incorrectly checked its cost, Mr. Roberts explained, adding that he was only seeking information as to why it was necessary for Wheeling Steel to "make such a drastic reduction" in prices.

Under further questioning Mr. Roberts asserted that the oil country market was fairly stable through 1937 and through the early part of 1938 and, to the best of his knowledge, there was no weakening in price. He recalled, however, that National Tube Co. announced a reduction of from 5 to 7½ per cent in the price of seamless tube in early July, 1938, and that this com-

pany reduced its prices on lapweld at two different times in August, 1938.

Mr. Schafer declared emphatically that Wheeling Steel was not the price leader in the industry. He said that following the company's price reductions on Aug. 1, 1938, consumers did not want the tonnage list increased so his organization attempted to work out a new list and on Aug. 24 revised its prices downward on tonnage or popular items and increased prices on non-tonnage items.

F.o.b. Mill Sales Discussed

After inserting in the record evidence that the Gulf Oil Co. had negotiated for the purchase of pipe on an f.o.b. mill basis, carrying the intimation that the practice of the mills in declining to sell on that basis involved a possible restraint of trade, Mr. Porter turned to F. H. Gibson, district sales manager of South Chester Tube Co., asking if the company ever deviated from its delivered price system of quoting prices.

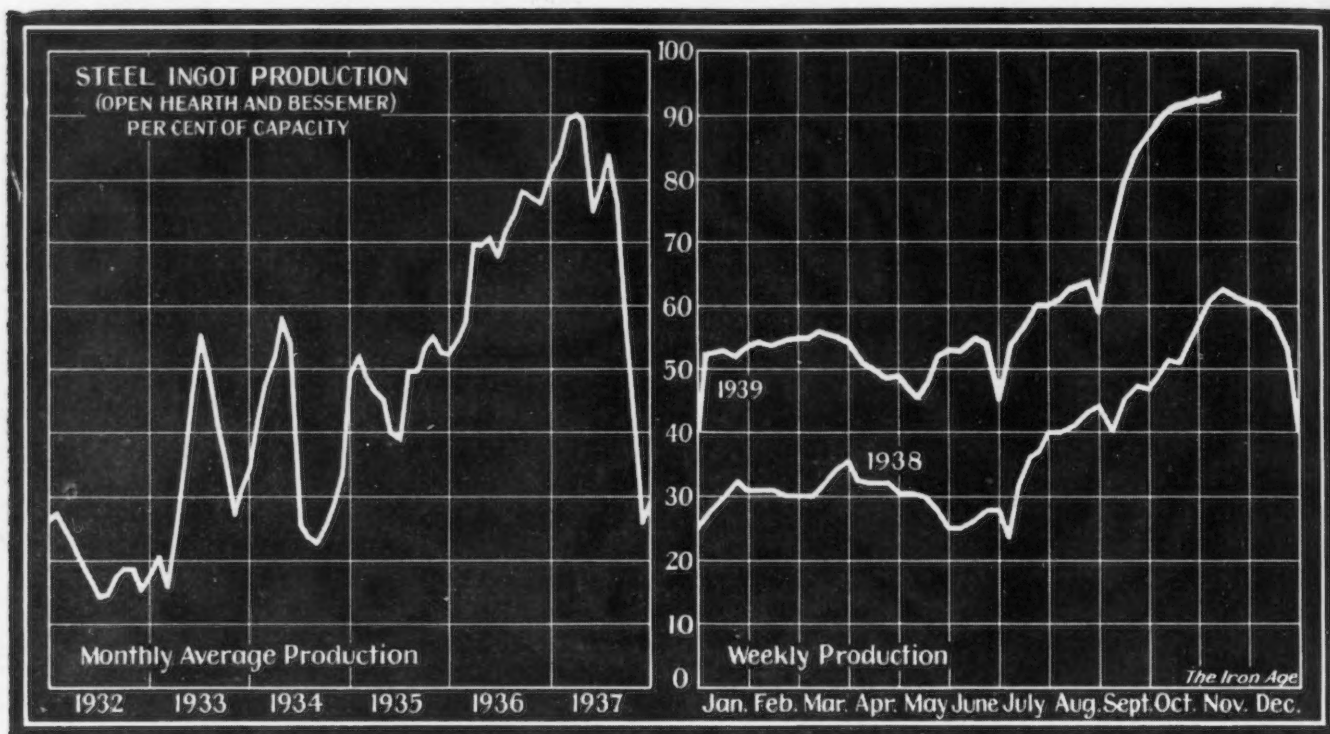
Mr. Gibson explained that with the exception of a few small orders the practice is to sell exclusively on a delivered price basis. The pipe manufacturer, he continued, is actually responsible for the product right up to its ultimate use and it is, therefore, essential for the manufacturer to maintain control over the product until it reaches destination.

"If the consumer takes over that liability," Mr. Porter asked, "would your company still decline to sell on an f.o.b. mill basis?"

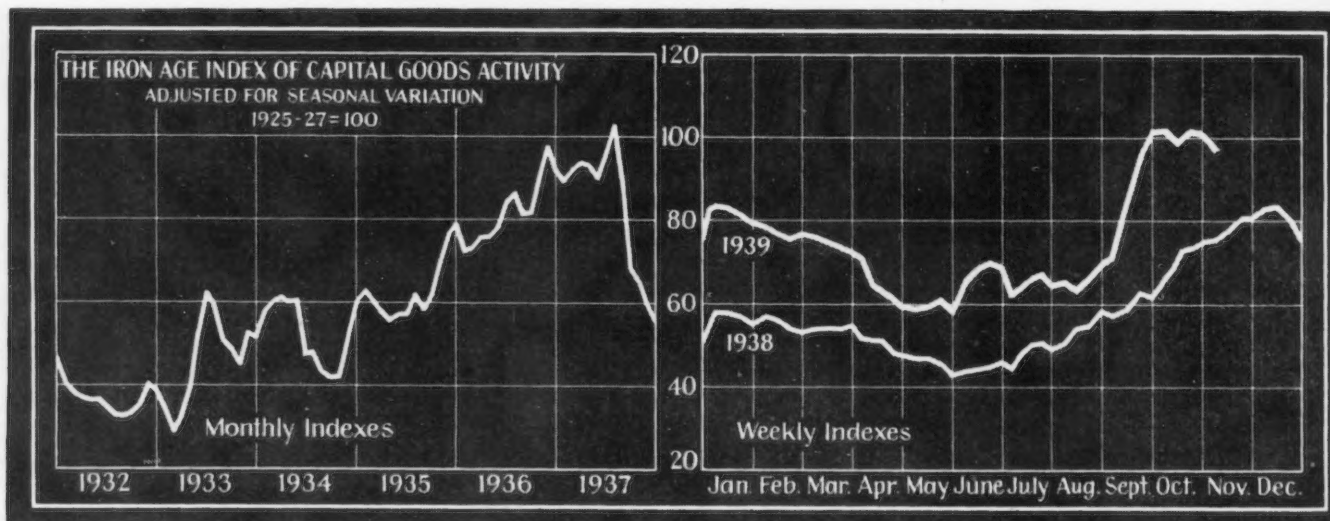
Mr. Gibson replied in the negative, pointing out that in such an event he saw no reason why the company would object. Mr. Porter said he assumed the Gulf Oil Co., in the case cited, wanted to save money by utilizing its own transportation facilities and Mr. Gibson agreed that such a motive usually prompts most steps taken in the business world.

Acme Steel Co. to Spend \$1,250,000 on Improvements

CHICAGO—The Acme Steel Co., producer of hot and cold rolled strip, is planning to spend about \$1,250,000 on additional cold rolling equipment to bring its cold strip capacity more in line with its potential hot mill output. Company officials emphasized that this expansion was not caused by war activity, or by anticipation of war business, but was merely a normal expenditure which has been under consideration for more than six months.



District Ingot Production, Per Cent of Capacity		Pittsburgh	Chicago	Valleys	Philadelphia	Cleveland	Buffalo	Wheeling	Detroit	Southern	S. Ohio	Western	St. Louis	Eastern	Aggregate
CURRENT WEEK..		93.0	94.0	94.0	83.0	89.0	94.5	93.0	100.0	88.0	89.5	85.0	84.0	92.0	93.5
PREVIOUS WEEK..		94.0	91.5	94.0	81.0	86.0	97.0	93.0	100.0	88.0	86.5	90.0	79.5	92.0	93.0



A SECOND consecutive decline was registered by THE IRON AGE index of capital goods activity in the past week due largely to the fact that without the usual contributions of the Chrysler units to the week's automobile assembly total, this series has been unable to keep pace with the rising seasonal trend. At the close of the week the combined index stood at 99.5, as compared with 100.8 in the preceding week. The automobile series itself was off 8.4 points in the week. The construction factor eased 2.1 points on the basis of the 13-week moving average employed in computing this index, although the dollar volume of the week's awards was up 7 per cent. The Pittsburgh series moved higher again, as did the steel and lumber components. The latter two increases were due to relatively unchanged physical output in the face of falling

seasonal trends, rather than to any actual improvement in activity. The increase in the lumber factor brought the unadjusted figure up to the highest level since the week of Sept. 26, 1937.

	Week Ended Nov. 11	Week Ended Nov. 4	Comparable Week	
			1938	1939
Steel ingot production ¹	136.3	134.4	89.5	104.6
Automobile production ²	99.4	107.8	89.1	102.2
Construction contracts ³	76.2	78.3	77.7	115.5
Forest products carloadings ⁴	70.7	69.6	54.4	106.9
Production and shipments, Pittsburgh District ⁵	115.0	114.0	65.9	108.0
Combined index	99.5	100.8	75.3	107.4

Sources: ¹ THE IRON AGE; ² Ward's Automotive Reports; ³ Engineering News-Record; ⁴ Association of American Railroads; ⁵ University of Pittsburgh.

Government Steel Prices

LAST week I sat in on one of the hearings of the TNEC, otherwise known as the "Monopoly" committee. Steel was the subject of inquiry at the time. This committee, as you know, is drawn from two sources: Elected representatives of Congress, who very largely (with one or two exceptions) sit back and listen, and New Deal administrative appointees, who do most of the talking.

In the interests of the taxpayers and the witnesses, who are jointly paying an enormous bill for the business education of these enterprising young men, we venture to make a suggestion to them that will add to the efficiency of the process. It is simply this: Ask **why** whenever you ask **what**. Then you and the public whom you represent will learn something about business.

It may be, of course, that the minority of young "leftist" economists and attorneys with which the TNEC is adulterated, having fixed notions regarding the goal of regimentation, is not interested in the "why's" of Capitalism. For, thus far, virtually all of the questioning has been devoted to find out **what** business does, but not why it does it. And the **why** is more important than the **what**, because it is the cause, whereas the **what** is the effect.

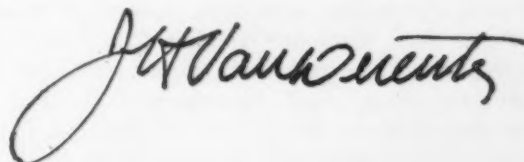
The inquisitors will not get this information unless they ask for it, because it is not considered etiquette, under the star chamber procedure that characterizes New Deal "investigations," for a witness to volunteer information. This calls for an admonition not to "make a speech" or a reminder that "we are the ones who are asking the questions."

If the star chamber boys had asked the steelmakers: "Why did you not give the Government the same price concessions that you did to some private industrial buyers on occasions during the depression?" they might have learned something about the difficulties of doing business with Uncle Sam.

They would have learned that private buying, with its "collective bargaining" between skilled purchasing agents and salesmen, is much more efficient, from the consumer's standpoint than is the "bid" system of the Government, especially in a buyer's market. Government purchasing is a matter not of negotiation but of opening envelopes.

They would have learned that 99 out of every hundred American manufacturers not only of steel but of other products would rather take a contract for supplying a reputable private consumer with a bill of goods than take an identical Government order at a 5 to 10 per cent higher price. And if you followed that with another "why," these manufacturers would tell you that the acceptance of a private order at least leaves the supplier with as much personal and corporate freedom as the law allows, whereas a Government order of \$10,000 or more automatically puts him in hock with John Lewis, Madam Perkins, Senator Wagner, the Labor Board and makes him subject to a host of restrictions foreign to our system of free enterprise.

Government work may cost less to get than private business, if you have a sharp lead pencil, but it costs more to handle through the plant, more to finish, and more to pass inspection. Enough more to make it more expensive than private business. There is no reason why the TNEC and the public should shut their eyes to this fact, nor the steel-makers overlook it.



... SUMMARY OF THE WEEK ...

... *Pressure for deliveries comes from many steel consumers.*

o o o

... *Operations up half point to 93.5%, with five districts gaining.*

o o o

... *First quarter prices still in doubt; scrap composite drops 80c. to \$19.83.*

PRESSURE from steel consumers for delivery provides strong evidence this week that much of the production of the steel industry, now operating half a point higher than last week at 93.5 per cent, is quickly passing into finished products and that inventories of most consumers still are at far below normal.

So far the steel industry is unable to detect signs of a backing up of the flow of steel from the mills to the ultimate consumers. Instead, such a steel outlet as the automotive industry is increasing estimates of its first quarter steel requirements and many types of consumers are pressing for earlier deliveries. Most steel companies in the last 10 days have made no progress in reducing their backlogs.

If steel plant operations are maintained at 90 per cent, a conservative estimate, through November and December, total ingot production for 1939 will be about 45,842,000 tons, or an average of 64 per cent for the year. This represents a gain, on a tonnage basis, of approximately 65 per cent above 1938 and will come within 9 per cent of the 50,318,000 tons produced in 1937.

INGOT production this week gained $2\frac{1}{2}$ points to 94 per cent at Chicago, 3 points to 89 per cent at Cleveland, $4\frac{1}{2}$ points to 84 at St. Louis, 2 points to 83 per cent at Philadelphia and 3 points to 89.5 per cent in the southern Ohio River district. These advances offset a one-point loss to 93 per cent at Pittsburgh. Unchanged rates were reported at Youngstown, 94 per cent; Wheeling-Weirton, 93 per cent; Detroit, 100 per cent; Birmingham, 88 per cent, and the Eastern area 92 per cent. Shipments of finished products by United States Steel Corp. subsidiaries for October rose 233,515 tons above September to 1,218,545 tons, while shipments for the first 10 months of 1939 totaled

8,076,972 tons compared with 5,251,511 tons in the corresponding period of 1938.

How long the steel industry can continue near capacity depends partly on prices, but what quotations will be for the first quarter remains uncertain. At the TNEC steel hearing in Washington, Benjamin F. Fairless, president, United States Steel Corp., declined to reveal the corporation's intentions with respect to first quarter prices. However, Charles R. Hook, president of American Rolling Mill Co., said he favored increased prices on sheets and strip to offset raw material costs. If steel prices for the first quarter are unchanged, some of the steel tonnage bought for delivery in the fourth quarter in anticipation of higher prices may be deferred until after Jan. 1. It seems unlikely such a delay would have any marked effect on December operations which seem likely to continue well above 90 per cent.

ONE steel raw material which declined in price this week was scrap, THE IRON AGE scrap composite dropping 80c. from last week to \$19.83. On Oct. 3, last, the scrap composite was \$22.50. Except at Cleveland, however, mill buying of scrap is light and No. 1 heavy melting steel is off \$1 a ton at Chicago and Philadelphia. Elsewhere scrap prices are drifting downward or are stationary despite maintenance of high melting rates.

In several steel-making centers organized labor is becoming more active, with the steel union hinting at a strike in its campaign to win a written contract from the second largest steel producer, and increasing its attempts to collect dues elsewhere. In New England, in the West and in the Mid-West, shortages of skilled workers are growing, due partly to the war demand for machinery. Cincinnati reports a pick-up in machine tool sales due to foreign buying, particularly by France, of equipment to manufacture aircraft engines and parts, including machine guns for aircraft use. Japan has three military groups in the U. S. buying ordnance-manufacturing machinery, while Brazil is buying machinery for making shells. Domestic machine tool buying continues heavy, with bookings for some firms in the East at six times the normal rate.

A 60,000-TON rail order by New York Central featured railroad steel buying the past week, bringing the cumulative total of rail purchases for the year to date close to 1,300,000 tons. Structural steel awards declined to 14,850 tons from 20,550 tons last week, the largest contract being 5000 tons for a Cleveland utility project. Reinforcing awards climbed to 9300 tons from 5115 tons last week.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Nov. 14, 1939	Nov. 7, 1939	Oct. 17, 1939	Nov. 15, *1938
Rails, heavy, at mill	\$40.00	\$40.00	\$40.00	\$40.00
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	40.00
Re-rolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	34.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	40.00
Wire rods: Nos. 4 and 5, Pittsburgh, Chicago, Cleveland	43.00	43.00	43.00	43.00
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	1.90

Finished Steel

Cents Per Lb.:	Nov. 14, 1939	Nov. 7, 1939	Oct. 17, 1939	Nov. 15, *1938
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15	2.15	2.15	2.25
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.10
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.10
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.65	2.65	2.65	2.70
Alloy bars: Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton	2.70	2.70	2.70	2.80
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.00	2.00	2.00	2.15
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.80	2.80	2.80	2.95
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.50	3.50
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.00	2.00	2.00	2.15
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.05	3.05	3.05	3.20

Cents Per Lb.:	Nov. 14, 1939	Nov. 7, 1939	Oct. 17, 1939	Nov. 15, *1938
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.55	2.55	2.55	2.45
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.60
Barbed wire, galv.: Pittsburgh, Chicago, Cleveland, Birmingham	†3.40	3.40	3.40	3.20
Tin plate, 100 lb. base box: Pittsburgh and Gary	\$5.00	\$5.00	\$5.00	†\$5.00

*Pittsburgh prices only.
†Applies to 80-rod spools only.
‡Subject to post-season adjustment.

Pig Iron

Per Gross Ton:	Nov. 14, 1939	Nov. 7, 1939	Oct. 17, 1939	Nov. 15, *1938
No. 2 fdy., Philadelphia	\$24.84	\$24.84	\$24.84	\$22.84
No. 2, Valley furnace	23.00	23.00	23.00	21.00
No. 2, Southern Cin'ti	23.06	23.06	23.06	21.06
No. 2, Birmingham	19.38	19.38	19.38	17.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	21.00
Basic, del'd eastern Pa.	24.34	24.34	24.34	22.34
Basic, Valley furnace	22.50	22.50	22.50	20.50
Malleable, Chicago†	23.00	23.00	23.00	21.00
Malleable, Valley	23.00	23.00	23.00	21.00
L. S. charcoal, Chicago	30.34	30.34	30.34	28.34
Ferromanganese, seab'd carlots	100.00	100.00	100.00	92.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:	Nov. 14, 1939	Nov. 7, 1939	Oct. 17, 1939	Nov. 15, *1938
Heavy melting steel, P'gh...	\$21.25	\$21.50	\$22.50	\$15.375
Heavy melting steel, Phila...	20.75	21.75	22.25	14.75
Heavy melting steel, Ch'go...	17.50	18.625	18.25	14.50
Carwheels, Chicago	17.50	17.50	17.50	13.00
Carwheels, Philadelphia	21.25	22.25	22.25	16.75
No. 1 cast, Pittsburgh	21.25	22.25	22.75	15.50
No. 1 cast, Philadelphia	22.25	24.25	24.25	16.75
No. 1 cast, Ch'go (net ton)	15.75	16.25	16.25	12.75

Coke, Connellsville

Per Net Ton at Oven:	Nov. 14, 1939	Nov. 7, 1939	Oct. 17, 1939	Nov. 15, *1938
Furnace coke, prompt	\$5.00	\$5.00	\$5.00	\$3.75
Foundry coke, prompt	5.75	5.75	5.75	4.75

Non-Ferrous Metals

Cents per Lb. to Large Buyers:	Nov. 14, 1939	Nov. 7, 1939	Oct. 17, 1939	Nov. 15, *1938
Copper, Electrolytic, Conn...	12.50	12.50	12.50	11.25
Copper, Lake, New York	12.50	12.50	12.50	11.375
Tin (Straits), New York...	**51.00	**54.50	**55.00	46.50
Zinc, East St. Louis	6.50	6.50	6.50	5.05
Zinc, New York	6.89	6.89	6.89	5.44
Lead, St. Louis	5.35	5.35	5.35	4.95
Lead, New York	5.50	5.50	5.50	5.10
Antimony (Asiatic), N. Y...	16.50	16.50	14.00	14.00

**Nominal.

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price table.

The Iron Age Composite Prices

Finished Steel

	Nov. 14, 1939	One week ago	One month ago	One year ago
2.236c. a Lb.	2.236	2.236	2.236	2.286

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

	HIGH	LOW
1939	2.286c., Jan. 3	2.236c., May 16
1938	2.512c., May 17	2.211c., Oct. 18
1937	2.512c., Mar. 9	2.249c., Jan. 4
1936	2.249c., Dec. 28	2.016c., Mar. 10
1935	2.062c., Oct. 1	2.056c., Jan. 8
1934	2.118c., Apr. 24	1.945c., Jan. 2
1933	1.953c., Oct. 3	1.792c., May 2
1932	1.915c., Sept. 6	1.870c., Mar. 15
1931	1.981c., Jan. 13	1.883c., Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9
1929	2.223c., Apr. 2	2.192c., Oct. 29
1928	2.192c., Dec. 11	2.142c., July 10

Pig Iron

	Nov. 14, 1939
\$22.61 a Gross Ton	22.61

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	HIGH	LOW
1939	\$22.61, Sept. 19	\$20.61, Sept. 12
1938	23.25, June 21	19.61, July 6
1937	23.25, Mar. 9	20.25, Feb. 16
1936	19.73, Nov. 24	18.73, Aug. 11
1935	18.84, Nov. 5	17.83, May 14
1934	17.90, May 11	16.90, Jan. 27
1933	16.90, Dec. 5	13.56, Jan. 3
1932	14.81, Jan. 5	13.56, Dec. 6
1931	15.90, Jan. 6	14.79, Dec. 15
1930	18.21, Jan. 7	15.90, Dec. 16
1929	18.71, May 14	18.21, Dec. 17
1928	18.59, Nov. 27	17.04, July 24

Steel Scrap

	Nov. 14, 1939
\$19.83 a Gross Ton	20.63

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	HIGH	LOW
1939	\$22.50, Oct. 3	\$14.08, May 16
1938	15.00, Nov. 22	11.00, June 7
1937	21.92, Mar. 30	12.92, Nov. 10
1936	17.75, Dec. 21	12.67, June 9
1935	13.42, Dec. 10	10.33, Apr. 29
1934	13.00, Mar. 13	9.50, Sept. 25
1933	12.25, Aug. 8	6.75, Jan. 3
1932	8.50, Jan. 12	6.43, July 5
1931	11.33, Jan. 6	8.50, Dec. 29
1930	15.00, Feb. 18	11.25, Dec. 9
1929	17.53, Jan. 29	14.08, Dec. 3
1928	16.50, Dec. 31	13.08, July 9

... THIS WEEK'S MARKET NEWS ...

NEW BUSINESS

... New orders decline; pressure for earlier deliveries continues

FRESH steel orders in the past week at PITTSBURGH have leveled off from the previous week. However, incoming specifications against previous commitments as well as against new business are, in the aggregate, equal to or in excess of shipments. Actual mill bookings are also equivalent to virtual capacity. Steel markets have settled down to a more normal basis with a considerable easing of tension. Pressure is still being exerted, however, for more prompt deliveries by many types of consumers.

CLEVELAND and YOUNGSTOWN steel mills are making only slow progress in reducing order backlogs. Consumers continue to place new business freely for shipment in first quarter, under encouragement by sellers. Many buyers have estimated their needs very generously. Production on a few mills has become more erratic, resulting from the long, high speed campaign prevailing during the past two months. Delivery promises by makers of steel mill rolls are greatly extended.

Some NEW YORK offices report sales are holding up at recent levels but others find an expected moderation in the rate at which new orders have been flowing in.

First quarter steel requirements for about 30,000 freight cars, which have been ordered from car builders, have not yet been placed. It is estimated that these cars will take around 300,000 tons of sheets, plates, bars and light shapes. With some Chicago mills already well into the first quarter on sheets and bars, this railroad tonnage alone probably will fill their books for the first period in these products.

Pressure from consumers for deliveries has not abated in the slightest, and Chicago mills are pointing to this fact as an indication that buyers generally are converting their steel into finished goods almost as soon as it is received. Inventories before September were at rock bottom levels and it is believed that most of what little inventory accumulation has been seen today is merely building a normal stock. Alloy steels are in good demand from makers of tractors and agricul-

tural machinery. Current production of farm tractors and implements is proceeding at a high rate. Forgers in the CHICAGO district have so many orders available that they are selecting only the most profitable business.

New bookings in EASTERN PENNSYLVANIA are currently considerably below the high October levels, both for the large producers as well as the smaller independent mills. Most new inquiry involves late first quarter delivery with price in effect at time of shipment to govern. Most of the Eastern Pennsylvania plate mills are booked well through December on sheared material and are operating their finishing equipment at capacity. The bulk of the material being rolled at present will be billed at 2.40c., Philadelphia. Despite the extended delivery dates ruling on most products, it is still possible to obtain certain types of sheets and plates for comparatively prompt shipment from several sources. Most of this material, however, carries premium prices. It is apparent from the character of consumers interest in shipment that the bulk of present output is going directly into production.

OPERATIONS

... Production again advances; four districts report gains

STEEL ingot output has advanced one-half point to 93.5 per cent, with a narrow dip at PITTSBURGH being offset by gains in several other centers. Last week's rate was 93 per cent.

While PITTSBURGH sagged a point to 93 per cent, a normal fluctuation in periods such as this, CHICAGO gained 2.5 points to 94, CLEVELAND-LORAIN three points to 89, EASTERN PENNSYLVANIA two points to 83 and SOUTH-EARN OHIO three points to 89.5 per cent.

Operations in the WHEELING-WEIRTON district were unchanged at 93, BIRMINGHAM at 88 and YOUNGSTOWN at 94 per cent. BUFFALO dropped 2.5 points to 94.5.

The American Iron and Steel Institute found ingot production for the week at 93.5 per cent, the highest level since the institute began reporting steel output.

PRICES

... Hook favors advance in flat-rolled products; Fairless silent

THE outlook for first quarter prices is almost as obscure this week as last with Benjamin F. Fairless declining to reveal United States Steel Corp.'s intentions regarding first quarter quotations. Charles R. Hook, president of American Rolling Mill Co., said at Washington that higher prices on sheets and strip are necessary to offset raw material costs. Some steel leaders favor an increase in such products as tin plate and galvanized sheets but anticipate no important changes elsewhere.

Firth-Sterling Steel Co., McKeesport, Pa., has pegged tungsten high speed tool steel price at 67c. per lb. for 1940.

PIG IRON

... Deliveries continue heavy, new business light

DELIVERIES of CLEVELAND and YOUNGSTOWN producers are close to the peak rate prevailing during late October, foundry coke shipments are easier, and new business in both pig iron and coke remains light.

CHICAGO district pig iron shipments up to Nov. 10 were running from 5 to 6 per cent ahead of October. First quarter books may be opened within a few weeks. Unless there is a general increase in steel prices, the first quarter pig iron price will probably remain at \$23. Shipments of foundry coke are virtually at capacity. The PITTSBURGH market shows little change, while at BIRMINGHAM shipments continue heavy, sales light and all 18 of that district's blast furnaces continue active.

A few scattered spot orders for no larger amounts than 100 tons are being placed in the St. LOUIS area, where shipments continue at a strong rate, with October movement being about 25 per cent ahead of September.

Some small orders for prompt shipment are reported at CINCINNATI where foundry operations tend lower and the melt is slipping under 50 per cent. Machine tool foundries continue very active, but the stove

foundries are reporting slow business. Labor troubles in the automotive field are affecting the automotive melt in that area and reports of an easing off in the malleable melts are also heard. Jobbing foundries, however, report a slight improvement during the past week, but this has not been sufficient to offset the easing in the other lines.

Buying for fourth quarter by melters who previously believed themselves fully covered and by others planning to have stock on hand Dec. 31 to carry them into the first quarter, continues good at Boston. Furnaces now say that in all probability all old contract iron will have been shipped before the close of this month. The aggregate New England melt is holding between 80 and 85 per cent and may, however, go above 90 per cent provided more foundries go on a night as well as day schedule. A Swedish freighter with 3400 tons of pig iron for Sweden is held up here. Seamen have struck for a \$150 bonus because of Nazi torpedo boat activities.

With most foundries covered well into the first quarter, buying in the past week in PHILADELPHIA was very light. Shipments are still on a prorated basis and are sharply below the demands of melters who would like to rebuild long neglected stock piles. Practically all branches of the casting industry in Philadelphia are now operating on a five-day basis, as compared with two and three days six weeks ago.

Water shippers in the NEW YORK district are rushing all barge shipments to local docks before the State Barge Canal is officially closed to traffic on Nov. 25. Shipments to consumers are going forward steadily. Heater plants and soil pipe makers are beginning to taper off, but at a much slower rate than normal seasonal activity would dictate. Inquiries for pig iron are current from Great Britain and the Continent, ranging up to 20,000 tons. New export business is well scattered but in no large tonnages.

MERCHANT BARS

... Output advances at Cleveland and Youngstown

PRODUCTION of CLEVELAND and YOUNGSTOWN bar mills has improved during the past ten days. Order backlogs extend into late January on the average, although small sizes are into February and some of the large sizes only into late December. The flow of new business is de-

scribed as being well maintained.

Hot rolled bar specifications, including those against previous commitments as well as fresh business, have eased off some in the past six days at PITTSBURGH but nevertheless continue in excess of actual shipments during that period. Demand is exceptionally diversified with automobile requirements no small factor.

Demand for merchant bars in the CHICAGO district is emanating from many sources, notably farm equipment and tractor makers, railroad car builders, forgers, cold drawers, and jobbers. It is estimated that within a few weeks first quarter bar capacity in some mills will have been sold.

SEMI-FINISHED STEEL

... New specifications equal outgoing shipments

SEMI-FINISHED steel shipments at PITTSBURGH continue exceptionally heavy but incoming specifications practically equal outgoing shipments, hence, no important change in backlogs is materializing. Wire rod commitments and specifications already have been heavy enough to earmark no small portion of first quarter 1940 capacity.

Inquiries remain extensive at CLEVELAND but practically no additional business can be accepted, as schedules are overtaxed for weeks ahead. Pressure is severe for deliveries from those buyers who did succeed in getting on books in early September.

PLATES

... Mills still unable to meet delivery requests of customers

NEW demand for plates still is active despite the heavy bookings of September and October and at many points shipping problems are acute. At CLEVELAND a considerable share of continuous strip mill output continues to be light plates. There is still some fairly heavy inquiry in the PHILADELPHIA market, including about 500 tons for part of a railroad repair program, but most of this inquiry is for projects which will not materialize until next year and buyers are doing considerable shopping before placing the orders.

Most of the independent mills in EASTERN PENNSYLVANIA, which recently have been the only source for fourth quarter shipment, are now

booked through December and can accept only first quarter business. The volume of new orders being received by these mills has dropped sharply in the past two weeks and is at present substantially below the weekly rate of shipments. Export demand has also slackened, although several small lots were accepted in the past week at 2.70c. f.a.s., Philadelphia.

Consumers of plates in the ST. LOUIS district report an improvement in their business, consisting of miscellaneous jobs, mostly small. Boiler shops show an improvement.

New plate volume in the NEW YORK district is light. Some of the smaller Eastern mills are keeping themselves in a fairly liquid position as regards deliveries, with promises ranging anywhere from three to five weeks, still giving these companies an edge over their larger competitors, however.

New export business remains light, although practically all European countries to which shipments can be made have been heard from in the way of inquiries. Inquiries are also in good volume from South America.

SHEETS AND STRIP

... First quarter rollings now largely reserved

A LARGE portion of sheet and strip rolling schedules at PITTSBURGH for the first quarter has been spoken for, either in the form of actual specifications or on the basis of known requirements from regular customers. Deliveries are fairly prompt but the lack of raw steel at some points is responsible for a maintenance of consumer pressure for faster shipments. The belief is growing that automobile manufacturers will require more steel in the first quarter of 1940 than was thought a month ago. Hence, many producers look for no appreciable letup in automotive specifications for some time. Although the rate of incoming business has slackened off some in the past week, orders representing old as well as new tonnage are still ahead of actual shipments and hence backlogs have been reduced little if any since the first of the month.

At CLEVELAND and YOUNGSTOWN rolling mill production has been slightly more erratic at some plants than a few weeks ago, due to mechanical effects of the high speed campaign prevailing since Labor Day. So far, any delays encountered have been of short duration, however. Inquiry for

sheets and strip continues moderately active.

First quarter orders for sheets and strip are still in good volume in CHICAGO. It appears that first quarter capacity will be sold up within a few weeks. One of the largest sheet consumers in this district, the railroad car building industry, is exerting considerable pressure for steel promised this year but as yet has placed scarcely any of its first quarter requirements. Steel for an estimated 30,000 cars has not yet been placed. Consumer pressure generally for deliveries is still regarded by mills as an indication that inventories are not being built up to excess.

Despite efforts of district sheet producers to discourage forward buying, orders for first quarter continue to be offered at CINCINNATI.

TUBULAR GOODS

... Pipe demand tapers at some points

PIPE production at PITTSBURGH continues substantially unchanged, with standard pipe requirements no small item. Oil-country goods shipments are being maintained at a high level and owing to a more liberal specifying by oil companies, this trend is expected to continue.

CLEVELAND and YOUNGSTOWN sellers report the past week has been a breathing spell as regards new business. Line pipe production continues strong and consigned stocks are being built up but in general tubular order backlogs are not as extended as in other steel mill products.

WIRE PRODUCTS

... Premiums obtained on export business

ATTRACTIVE premiums prevailing on export wire business are reported by CLEVELAND sellers, but acceptance is limited by the booked-up conditions of mills well into the first quarter. Considerable export business, principally from South America, is already on the books.

Although shipments of manufacturers' wire at PITTSBURGH are being maintained at a high level, actual orders which represent specifications against previous commitments or denote fresh business placed recently

are, in the aggregate, in excess of shipments so far this month. Within the next month or so, productive facilities for manufacturers' wire in the first quarter will undoubtedly be accounted for by actual commitments and specifications. Movement of merchant wire products continues heavy and mills face a gigantic task if all business on the books is to be shipped before the end of the year.

Little change has been noticed over the past few weeks in the volume of new business received by CHICAGO sellers. Most of the tonnage consists of manufacturing wire, a downward trend having been noticed recently in merchant wire products. It is reported that not a great deal of tonnage is on the books for first quarter shipments, and mill representatives believe that the carryover of fourth quarter business into 1940 will be quite small.

STRUCTURAL STEEL

... Lettings down; new projects also decline

STRUCTURAL steel lettings declined to 14,850 tons from 20,550 tons last week. The only sizable awards are 5000 tons for the Cleveland Electric Illuminating Co. expansion at Cleveland, and 1950 tons for transmission towers for the TVA at Cleveland, Tenn.

New structural projects are lower at 16,900 tons as against 22,750 tons a week ago. The bulk of inquiries is in small tonnages, the largest including 2000 tons at Cleveland for the Cleveland municipal lighting plant expansion; 1600 for the Naval Medical Center tower at Washington; 1500 tons for the East New York Vocational School, Brooklyn; 1500 tons for a State hospital building at Willowbrook, N. Y., and 1200 tons for a bridge for the Norfolk & Western Railroad at Maybeury, W. Va.

Gratifying to steel producers has been the slow but nevertheless important increase in the number of privately financed projects as compared with governmental or municipal jobs. Although tonnages involved in inquiries and awards are not as large as a few months ago, the number of undertakings appears to have increased.

Approximately 1500 tons of sheet and H-type bearing piles for a Navy graving dock at Bremerton, Wash., will be furnished by Bethlehem Steel Co.

REINFORCING STEEL

Reinforcing steel lettings of 9300 tons the past week include 3500 tons for the Vladeck housing project in New York; 2700 tons for a concrete pipe line at Deer Creek, Utah, for the Provo River project, and approximately 1500 tons for a graving dock at Bremerton, Wash.

New reinforcing steel projects total 6315 tons, with no inquiry more than 800 tons.

No awards or inquiries of consequence have been reported recently in CHICAGO. A considerable volume of small work is underway, however. Mills do not seem anxious for tonnage because of congestion caused by other products, though no jobs are going begging. A good deal of time is being spent by sales staffs in obtaining material already ordered.

An important percentage of current reinforcing bar business at PITTSBURGH involves projects requiring 50 tons of bars or less. Jobbers' stocks are low and are being continually cleaned out owing to delayed deliveries from steel producers. On the whole, prices appear to be holding at or close to published quotations.

CLEVELAND reports that export prices as high as 2.75c. New York, are being offered for reinforcing bars, but acceptance is limited, due to the extensive domestic demand.

RAILROAD BUYING

... 60,000-ton rail purchase features market

OUTSIDE of a purchase of 60,000 tons of rails by New York Central, there was little noteworthy activity in the railroad market in the past week. The Central purchase, which brings the cumulative total of rail purchase for the year to date to close to 1,300,000 tons, was divided among Carnegie-Illinois Steel Corp., Bethlehem Steel Co. and Inland Steel Co. The Carnegie Company also booked an order for 14,000 tons of rails from a Brazilian railroad interest.

Companhia dos Caminhos de Ferro Portugueses, a Portugal interest, has placed 28 stainless steel, lightweight passenger cars with Edward G. Budd Mfg. Co., and Utah Copper Co. has purchased 100 ore cars from Pressed Steel Car Co. Lake Erie Terminal is taking bids on 100 to 200 gondola cars.

To finance the purchase of 500 all-steel box cars of 50-ton capacity, the

MONTHLY SHIPMENTS OF FINISHED STEEL PRODUCTS BY UNITED STATES STEEL CORP.—TONS

Month	1935		1936		1937		1938		1939	
	Ship-ments	Per Cent of Capacity	Ship-ments	Per Cent of Capacity	Ship-ments	Per Cent of Capacity	Ship-ments	Per Cent of Capacity	Ship-ments	Per Cent of Capacity
January	534,055	31.9	721,414	44.8	1,149,918	75.4	518,322	33.7	789,305	51.8
February	583,137	39.2	676,315	45.3	1,133,724	82.5	474,723	35.5	677,994	49.3
March	668,056	41.5	783,552	50.5	1,414,399	92.7	572,199	37.2	767,910	50.4
April	591,728	36.7	979,907	63.2	1,343,644	91.0	501,972	33.7	701,459	47.5
May	598,915	35.8	984,097	63.4	1,304,039	85.5	465,081	30.2	723,165	47.4
June	578,108	36.7	886,065	57.1	1,268,550	85.8	478,057	32.1	733,433	49.7
July	547,794	34.0	950,851	61.3	1,186,752	77.9	441,570	28.8	676,309	44.5
August	624,497	37.3	923,703	59.6	1,107,858	72.6	558,634	36.3	803,822	52.7
September	614,933	39.7	961,803	62.0	1,047,962	71.1	577,666	37.5	985,030	66.9
October	686,741	41.1	1,007,417	62.6	792,310	52.0	663,287	43.1	1,218,545	79.9
November	681,820	42.3	882,643	59.2	587,241	39.7	679,653	45.6	.....	.....
December	661,515	42.7	1,067,365	68.8	489,070	32.1	694,204	45.2	.....	.....
Minus yearly adjustment	(—23,750)	...	(—40,859)	...	(—77,113)	...	(+30,381)	...	.....	.....
Total for year	7,347,549	38.1	10,784,273	58.2	12,748,354	70.4	6,655,749	36.7	.....	.....

* Annual finished steel capacity 17,940,600 gross tons, with monthly percentages based on actual number of weeks in each month.

U. S. Steel Shipments in October up 233,515 Tons

UNITED STATES STEEL CORP. subsidiaries in October shipped 1,218,545 tons of finished steel

products, an increase of 233,515 tons above September and an advance of 555,258 tons over the total in October,

1938. Shipments for the first 10 months of 1939 were 8,076,972 tons compared with 5,251,511 tons in the corresponding period of 1938.

Texas & Pacific Railway Co., has asked the Reconstruction Finance Corp. to buy \$1,335,000 of 3 per cent equipment-trust certificates.

TIN PLATE

... Operations unchanged at 96%

TIN plate operations are still unchanged this week at 96 per cent. With the exception of obsolete equipment and some high cost plants, the industry is utilizing its total capacity. No important change in the rate is expected in the near future. Owing to the uncertainty in the foreign situation, new tin plate prices will probably not be available until the latest possible date. Canada may buy considerable tin plate in the United States.

SWOC Group Visits Bethlehem Office

A GROUP of SWOC representatives, some whom have met with the management in various Bethlehem Steel Co. plants, this week appeared at the company's New York office and demanded to see Eugene G. Grace, Bethlehem president. When told Mr. Grace and other Bethlehem Steel executives were at Bethlehem, Pa., headquarters of the company, the SWOC delegation posed for pictures, and handed a statement to newspapermen who had accompanied them.

The SWOC group said charges of failure to bargain collectively with employees would be filed with the NLRB, and E. J. Lever, director of

the SWOC campaign to organize Bethlehem employees into the CIO affiliate, announced that he was not in favor of a strike but that the question "was solely in the hands of Eugene Grace."

Second Air Conditioner For Woodward Stacks

THE second air conditioning unit for its three blast furnaces, at Woodward, Ala., has been ordered by the Woodward Iron Co., according to H. Amberg, president. Work will begin at once and the additional unit will be ready for operation within 90 days. The cost will be about \$75,000 as for the first unit.

Weekly Bookings of Construction Steel

	Week Ended			Year to Date	
	Nov. 14, 1939	Nov. 7, 1939	Oct. 17, 1939	1939	1938
Fabricated structural steel awards	14,850	20,550	18,450	17,770	866,025
Fabricated plate awards	150	3,150	1,440	1,545	174,465
Steel sheet piling awards	1,500	2,770	1,290	400	74,565
Reinforcing bar awards	9,300	5,115	7,950	4,750	421,965
Total Letting of Construction Steel	25,800	31,585	29,130	24,395	1,537,020

War May Obscure Unsolved Domestic Problems, Says T. M. Girdler

CLEVELAND—Addressing members and guests of the Cleveland Chamber of Commerce at a "Steel Makers Dinner" Tuesday night here, T. M. Girdler, chairman, Republic Steel Corp., touched briefly upon the recent U. S. Circuit Court of Appeals' decision in Republic's labor case, pointing out that the amount of back pay which might have to be paid by the company, even if upon final appeal the Supreme Court upheld the Labor Board, would amount to only a fraction of the \$7,500,000 mentioned in this connection in recent newspaper comments.

Commenting on the general outlook for business, Mr. Girdler said, "I am not one of those who believe that the whole of our present increased industrial activities is due to the war in Europe and that peace in itself would bring complete collapse.

"Business improvement in this country had been under way since last spring. Chiefly it was based upon the cumulative requirements for many products and the growing confidence of private capital that the extreme left-wing schemes and designs of the New Deal were falling into popular disfavor. Such portion of the increase that is due purely to the war causes, of course would be wiped out by peace but the ending of the war should not destroy the forces of recovery which were at work before the war started.

"What really is to be feared is the loss of that growing confidence for the future of private enterprise which was a large factor in the business gains earlier in the year.

"There is danger that the dramatic events of the war will so absorb the attention of the American people that their thoughts will be diverted from domestic problems. The war in Europe has brought no permanent solution to any of our problems. It is time we gave some thought to them."

Among such outstanding problems, Mr. Girdler listed: Government spending of an excessive amount of income, large unemployment and the problem of relief, an excessive tax burden on enterprise, a one-sided Labor Relations Act, and "a state of mind which encourages the view that the country can have more by producing less."

Some progress had been made, he said, in the last session of Congress toward solving some of these problems,

mentioning tax law revisions and legislation "designed to stop the playing of politics with our system of relief." He emphasized as of particular importance the Congressional committee for the investigation of the National Labor Relations Board, stating that the Wagner Act had done more to disturb industrial relations in the United States than any other legislation in the history of the country.

TNEC to Attack System Of Pricing Again

WASHINGTON—The Federal Trade Commission will be given another opportunity early in January to attack the basing point system and to praise its proposed f.o.b. mill pricing substitute when the Temporary National Economic Committee reopens its steel hearings early in January. The additional sessions are being called to permit the United States Steel Corp. to bring before the committee its comprehensive studies of

Chrome Plated Gage Blocks Being Offered by Ford

CHROME plated Johansson gage blocks are being offered to the trade by the Ford Motor Co., it has been announced. The company is offering new sets of gage blocks with chrome plating and is also reconditioning entire sets of blocks by the chrome plating methods.

A system of exchanging new or reconditioned sets of blocks for customers' sets also is in effect. Blocks traded in will be plated and reconditioned and offered on the exchange basis. This does not imply that customers' sets of blocks can be sent in for reconditioning and then returned to the customer. It is understood that the reason for this is that various preliminary operations, including the plating and grinding, are being done on lots of similar sized blocks, and no individual sets are being sent through the process.

Prices on the chrome plated blocks are on the following basis: New sets, working blocks, 20 per cent above current new prices; inspection sets, 25 per cent above current new prices. Re-

the industry in all its ramifications.

This material, described by some members of the TNEC as more comprehensive than any ever attempted to be gathered before on the subject, has been divided into two parts. The first, covering the basing point system, has been assigned to the FTC for handling when the January hearing opens. The second, relating to costs, demand, returns and voluminous information covering additional data, will be considered by the committee.

Leon Henderson, former executive secretary of the TNEC and now a member of the Securities and Exchange Commission, made the announcement as the TNEC brought its sixth session of the steel hearings to a close last Wednesday. Mr. Henderson said that after a perfunctory examination of the material there had been some discussion as to the best manner of presenting it and that it was decided to proceed in this manner, provided a mutually satisfactory date can be reached with officials of the Steel corporation. It was explained that only officials of that corporation will be called before the committee.

Dates have not been fixed for the sessions but they are expected to be set for as early in January as possible, it was said.

conditioned blocks, chrome plated, will cost 10 per cent extra for the working sets and 15 per cent extra for inspection sets.

It is also learned that deliveries on gage blocks have been extended somewhat due to recent business activity.

Pullman Standard Reopens Car Plant Closed Two Years

CHICAGO—With railroad orders booming, Pullman Standard Car Mfg. Co. has placed in operation for the first time in two years its large, modern freight car shops at Hammond, Ind. This plant, together with the Michigan City, Ind., works makes available to Pullman Standard a large capacity for the production of freight cars in this district.

In order to increase its chilled car wheel capacity in the north, Pullman Standard has taken over the foundry of American Brake Shoe & Foundry Co., at Hammond, the latter company in the same transaction obtaining the Pullman Standard chilled wheel foundry at Houston, Tex.

CAST IRON PIPE

Warren Foundry & Pipe Corp. has been awarded 300 tons of 12-in. pipe for a WPA Providence, R. I., project.

State of Massachusetts has awarded 175 tons of 8 and 10-in. pipe to Warren Foundry & Pipe Corp.

New Bedford, Mass., has placed a tonnage of pipe with the United States Pipe & Foundry Co., Boston, on its bid of 84c. per foot. R. D. Wood Co. bid 87c.

Spartanburg, S. C., plans pipe lines for water system. Fund of about \$140,900 is being arranged through Federal aid for this and other waterworks installation.

Newhall, Iowa, plans water pipe line system and other waterworks installation. Bond issue of \$18,000 has been approved. Howard R. Green Co., 417 First Avenue, S.E., Cedar Rapids, Iowa, is consulting engineer.

Ignatius, Mont., plans pipe lines for water system and other waterworks installation. Bids recently received (low bid \$34,603) have been rejected and new survey is in progress. Bids on revised plans will be asked soon.

Forest Hill, Tex., will ask bids soon on pipe line extensions in water system. Cost about \$20,000.

Marlborough Water District, near Kansas City, Mo., now being organized, care of Charles A. Haskins & Co., Finance Building, Kansas City, consulting engineers, plans pipe lines for water system in Marlborough area. Surveys and estimates of cost being made by engineers noted.

Board of Pinellas County Commissioners, Clearwater, Fla., plans about 20,000 ft. for extensions in water system; also 500,000-gal. elevated steel tank and other waterworks installation. Cost about \$70,000. Financing in part has been arranged through Federal aid.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 21 for cast iron soil and water pipe for Eastern and Western navy yards (Schedule 7628).

Canton, Ohio, will take bids soon for pipe line extensions in water system in Colonial Heights district. Cost about \$20,000.

Goshen, Ind., plans 2 and 6-in. pipe for extensions in water system in Westmoor district. Fund of about \$90,470 has been arranged for this and extensions and replacements in sewer lines. Merle Miller is city engineer.

... PIPE LINES ...

Gulf Oil Corp., Gulf Building, Pittsburgh, has approved plans for new welded steel pipe line, 8½ and 6½-in., from Port St. Joe, Fla., to Atlanta, Ga., passing through part of Alabama, about 450 miles in all, for gasoline transmission. Line will require about 25,000 tons of pipe. A bulk terminal will be located at Port St. Joe, with large pumping station, to handle gasoline transported by tankers from company refinery at Port Arthur, Tex. Another terminal station will be located at Atlanta terminus. Booster pumping stations will be installed along route.

Shell Oil Co., Inc., 1008 West Sixth Street, Los Angeles, plans 14-in. welded steel submarine pipe line in Pacific Ocean near Ventura wharf, Ventura, Cal., totaling about 2900 ft., for oil loading service to tankers, with loading hose, buoys and other operating facilities.

M-A-R Pipe Line Co., Corpus Christi, Tex., plans new 6-in. welded pipe line from Ben Bolt oil field district, Jim Wells County, Tex., to Corpus Christi, for crude oil transmission to terminal plant of Terminal Refining Co., at latter place. C. Andrade, III, Tower Petroleum Building, Dallas, Tex., oil

operator, will have joint interest in line and will be active in project.

Montana-Dakota Utilities Co., 331 Second Avenue South, Minneapolis, Minn., is considering new welded steel pipe line from Bowdoin dome gas field district, Valley and Phillips Counties, Mont., to point near Glendive, Mont., by way of Fort Peck, for natural gas transmission. Connection will be made at Glendive with main pipe line system of company extending into parts of Minnesota and North Dakota, where gas is furnished to different municipalities.

Picayune, Miss., has voted bonds for \$220,000 for steel pipe line system for municipal natural gas distribution, including main welded steel pipe line for connection with supply source, control station and other operating facilities. S. Logan McConnell, Monroe, La., is consulting engineer.

Southern Pipe Line Co., Corpus Christi, Tex., plans 6-in. welded pipe line from oil field in San Patricio County to Corpus Christi, about 21 miles, for crude oil transmission to company oil refinery on channel at latter place. It is proposed to use welded joint cast iron pressure pipe. Work will be carried out by company forces.

Corpus Christi Corp., Corpus Christi, Tex., W. A. Warren, president, plans 4-in. welded steel pipe line from Stratton oil field, Nueces County, Tex., to Corpus Christi, for crude oil transmission, forming a loop with present pipe line between such points. Pumping stations will be installed for booster service. Company also plans welded steel pipe line for natural gas transmission to new recycling plant to be constructed in Stratton field, including pipe line gathering system. Entire project is estimated to cost over \$150,000.

Water District No. 56, Redondo Beach, Wash., plans about 22,000 ft. of steel pipe lines for water system; also two 50,000-gal. elevated steel tanks and towers, pumping station and other waterworks installation. Financing is being arranged through Federal aid. Parker & Hill, Smith Tower Building, Seattle, are consulting engineers.

Court Upholds NLRB On Republic Strike

PHILADELPHIA—The Third Circuit Court of Appeals here has upheld a NLRB order directing Republic Steel Corp. to rehire 5000 employees discharged in the 1937 steel strike and to pay them back wages of \$7,500,000.

The court upheld almost every point of the Labor Board order which placed the blame for the strike in Republic's plants at Youngstown, Canton, Cleveland and other points upon the company rather than upon the SWOC.

In an unanimous decision the court asserted that the "Little Steel" strike could not be classified as a sit-down strike and therefore did not fall under the Supreme Court ruling that sit-down strikers are liable to loss of their jobs. In its opinion the court said:

"The board (NLRB) found that the underlying cause of the strike and a substantial factor in its precipitation on May 25 and 26, 1937, was Republic's campaign to crush the

union by means of the unfair labor practices in which the board found Republic had engaged in prior to the strike and which we have already described. We think this finding is supported by the evidence and must be sustained."

Republic Steel officials said they will appeal the Philadelphia decision to the United States Supreme Court. All but a few of the strikers have been rehired, company officials said.

SWOC Candidates Win In Steel Communities

PITTSBURGH—The Steel Workers Organizing Committee helped elect successful candidates for office in a number of industrial towns. At Johnstown, Pa., John Conway, Democrat, and candidate of the SWOC, defeated Daniel J. Shields, Republican, for mayor.

For the first time the borough council at Aliquippa, Pa., is controlled by Democrats, three of the four new members also being members of the SWOC. Paul Normile, a SWOC organizer, is chairman of the borough council.

Two steel union members were elected to the Midland, Pa., council, one member to be Midland city assessor, and two SWOC candidates joined the Ambridge, Pa., council. Another SWOC member was elected a member of the borough council at Charleroi, Pa.

... GREAT BRITAIN ...

... Recent price advance has not checked demand.

LONDON, Nov. 14 (By Cable)—The recent rise in British home prices has not checked demand, and an abundance of orders is awaiting acceptance by makers when pressure of priority slackens. No period has been fixed for the duration of prices so that all orders are subject to prices ruling at the time of delivery.

Sheet rollers are now able to ease up on air raid shelters and are hoping to handle long delayed commercial orders.

Tin plate is active with a good demand in Empire markets and South America.

The Continent reports a big demand for steel bars, profiles, and plates from United Kingdom, Holland, Scandinavia and South America.

FABRICATED STEEL

... Lettings decline to 14,850 tons from 20,550 tons last week ... New projects lower at 16,900 tons as against 22,750 tons a week ago ... Plate awards only 150 tons.

NORTH ATLANTIC STATES AWARDS

- 450 Tons, Burlington, N. J., turbine supports for Public Service Electric & Gas Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 295 Tons, New York, addition to Consolidated Edison Co. Waterside station, to Bethlehem Steel Co., Bethlehem, Pa.
- 235 Tons, Tioga County, N. Y., State highway bridge, to Lackawanna Steel Construction Corp., Buffalo.
- 150 Tons, Orange, N. J., addition to Orange Memorial Hospital, to H. R. Goeller, Inc., Hillside, N. J.
- 150 Tons, New York, curbing for East River Drive, contract No. 4, to Eggleston Brothers & Co., Long Island City, N. Y.
- 130 Tons, Lockport, N. Y., Simonds Saw & Steel Co. heat treating and storage building, to Austin Co., Cleveland.
- 110 Tons, Newark, N. J., Rheem barrel factory, to Bethlehem Steel Co., Bethlehem, Pa.

THE SOUTH

- 1950 Tons, Cleveland, Tenn., transmission towers for TVA, to American Bridge Co., Pittsburgh.
- 800 Tons, Nashville, Tenn., Stinson Aircraft Division, Aviation Mfg. Co., factory and office building, to International Steel & Iron Co., Evansville, Ind.
- 440 Tons, Randolph County, Ark., bridge, to Clinton Bridge Co., Clinton, Iowa.
- 360 Tons, Harmon County, Okla., bridge, to Capitol Steel & Iron Co., Oklahoma City.
- 330 Tons, Custer and Roger Mills Counties, Okla., bridge, to Patterson Steel Co., Tulsa, Okla.
- 325 Tons, Kay County, Okla., bridge, to Kansas City Structural Steel Co., Kansas City, Kan.
- 570 Tons, Latimer County, Okla., two bridges, to Capitol Steel & Iron Co., Oklahoma City.
- 225 Tons, Coal County, Okla., bridge, to Capitol Steel & Iron Co., Oklahoma City.
- 170 Tons, Brice, N. C., Duke Power Co., stack, flues, duct work, to Carolina Steel & Iron Co., Greensboro, N. C.
- 125 Tons, Lowell, N. C., bridge, to Southern Engineering Co., Charlotte, N. C.
- 120 Tons, Texarkana, Ark., bridge, to J. B. Klein Iron & Foundry Co., Oklahoma City.
- 110 Tons, Gillespie County, Tex., bridge, to North Texas Iron & Steel Co., Fort Worth, Tex.

CENTRAL STATES

- 5000 Tons, Cleveland, Cleveland Electric Illuminating Co. expansion, to American Bridge Co., Pittsburgh.
- 346 Tons, Chicago, General Electric Co. building, to American Bridge Co., Pittsburgh, through James Stewart Co., New York, contractor.
- 240 Tons, Minnesota City, Minn., State bridges Nos. 5793 and 5869, to Bethlehem Steel Co., Bethlehem, Pa.
- 200 Tons, Chicago, Kaiser Ductett Co. factory building, to Midland Structural Steel Co., Cicero, Ill.
- 160 Tons, Cleveland, Republic Steel Corp. stripper building extension, to Lackawanna Steel Construction Corp., Buffalo.
- 150 Tons, Brown County, Ohio, bridge, to Fort Pitt Bridge Works Co., Pittsburgh.
- 140 Tons, St. Marys, Ohio, factory building for St. Marys Mfg. Co., to American Bridge Co., Pittsburgh.
- 125 Tons, State of Iowa, truss and girder spans for Milwaukee Road, to Milwaukee Bridge Co., Milwaukee.
- 120 Tons, Valparaiso, Ind., State bridge, contract 1841, to American Bridge Co., Pittsburgh.
- 110 Tons, Battle Creek, Iowa, State bridge FAS-218, to Pittsburgh-Des Moines Steel Co., Pittsburgh.
- 105 Tons, Chicago, repairs to bridges, for Milwaukee Road, to Bethlehem Steel Co., Bethlehem, Pa.

WESTERN STATES

- 300 Tons, Los Angeles, Fruehauf Trailer Co., factory building, to Pennsylvania Iron & Steel Co., Los Angeles.
- 260 Tons, Orleans, Cal., Klamath River bridge, to Judson-Pacific Co., San Francisco, through C. W. Caletti & Co., San Rafael, Cal., contractors.

- 125 Tons, Bellflower, Cal., market, to Pennsylvania Iron & Steel Co., Los Angeles.

SOUTH AMERICA

- 400 Tons, Government of Colombia, two warehouses, to Ingalls Iron Works Co., Birmingham.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

- 4950 Tons, Newark, N. J., bridge over Passaic River, route No. 25; American Bridge Co., Pittsburgh, low bidder.
- 1600 Tons, Washington, Naval Medical Center tower.
- 1500 Tons, Brooklyn, East New York Vocational School.
- 1500 Tons, Willowbrook, N. Y., State hospital building.
- 800 Tons, Neville Island, Pa., building for Vulcan Detinning Co.
- 700 Tons, Washington, skating rink for M. J. Uline.
- 550 Tons, Bayonne, N. J., building and shelters for Electric Boat Co.
- 500 Tons, Medway, Me., State bridge over Penobscot River.
- 500 Tons, New York, structures for Railway Express Agency.
- 375 Tons, Wyndmoor, Pa., laboratory for Department of Agriculture.
- 210 Tons, Providence, R. I., generator foundation for Narragansett Electric Co.
- 170 Tons, New York, building for Community Church of New York.
- 170 Tons, Newark, N. J., plant addition for Hygienic Tube & Container Corp.
- 170 Tons, Midland, Pa., extension to overhead building for Pittsburgh Crucible Steel Co. of America.
- 150 Tons, Providence, R. I., substation extension for Narragansett Electric Co.
- 150 Tons, Summit, N. J., building addition for Ciba Pharmaceutical Products, Inc.
- 115 Tons, Bayway, N. J., contact plant for Standard Oil Co. of New Jersey.
- 110 Tons, Amsterdam, N. Y., reinforcing building for Bigelow-Sanford Carpet Co.
- 110 Tons, Edgewater, N. J., warehouse for Hills Bros. Coffee, Inc.

SOUTH AND SOUTHWEST

- 1200 Tons, Mayberry, W. Va., bridge No. 860 for Norfolk & Western Railroad.
- 600 Tons, Clinch Valley, Va., replacing bridges for Norfolk & Western Railroad.
- 600 Tons, Louisville, Ky., Woolworth store building for Levi-Tyler Land Co.
- 500 Tons, Winston, N. C., bridges for Norfolk & Western Railroad.
- 250 Tons, State of Arkansas, two highway bridges; bids Nov. 28.
- 135 Tons, Galisteo, N. M., bridge on route 41; Henry Thygesen & Co., Albuquerque, N. M., contractors.

CENTRAL STATES

- 2000 Tons, Cleveland, municipal light plant expansion; bids Dec. 1.
- 400 Tons, Peoria, Ill., laboratory building for Department of Agriculture.
- 300 Tons, St. Bernard, Ohio, building No. 38 for Cincinnati Chemical Works.
- 300 Tons, Evanston, Ill., Patten gymnasium for Northwestern University.
- 250 Tons, Georgetown, Ohio, State bridge.
- 200 Tons, Minneapolis, office building and hangar, Wold-Chamberlain Airport.
- 170 Tons, Batavia, Ohio, State grade separation.
- 150 Tons, Appleton, Wis., reconstruction of Fox River dam; bids Nov. 21 by United States Engineers, at Milwaukee.
- 125 Tons, Cincinnati, addition, office building, for Union Central Life Insurance Co.
- 100 Tons, East St. Louis, Ill., Sanitary District bridge; bids Nov. 21.

WESTERN STATES

- 163 Tons, Moran, Wyo., bridge on Moran-DuBois Road; bids in.
- 180 Tons, Riverton, Wyo., State bridges FAP-159-1.

FABRICATED PLATES

AWARDS

- 150 Tons, Morgantown, W. Va., three tanks, roof and supports for Eureka Pipe Line Co., to Miles P. Brown Boiler Works, Franklin, Pa.

SHEET PILING

AWARDS

- 1500 Tons, Bremerton, Wash., graving dock, to Bethlehem Steel Co. through Maceo Construction Co., Clearwater, Cal., and Case Construction Co., San Pedro, Cal., joint contractors; includes H-type bearing piles.

REINFORCING STEEL

ATLANTIC STATES AWARDS

- 3500 Tons, New York, superstructure, Vladeck Housing, to Bethlehem Steel Co., Bethlehem, Pa., through George A. Fuller Co., contractor.
- 100 Tons, Boston, theater, to Morrison-Stevens Co., Boston.
- 100 Tons, Hartford, Conn., Hanson-Whitney Machine Co., plant, to Truscon Steel Co., Boston.

SOUTH AND CENTRAL

- 350 Tons, Lexington, Ky., housing project, to Pollak Steel Co., Cincinnati, through George H. Rommel Co., contractor.
- 300 Tons, Champaign, Ill., distribution tunnels, to Laclede Steel Co., St. Louis, through Lyman Construction Co., contractor.
- 275 Tons, Richmond, Va., penitentiary cell blocks, to Bethlehem Steel Co., Bethlehem, Pa., through Virginia Steel Co.
- 150 Tons, Savanna, Ill., powder and ammunition magazines, to Laclede Steel Co., St. Louis, through Manhattan Construction Co., contractor.

WESTERN STATES

- 2700 Tons, Deer Creek, Utah, concrete pipe line for Provo River project, to Colorado Fuel & Iron Corp., Denver, through Utah Concrete Pipe Co., Salt Lake City, contractor.
- 1500 Tons, Bremerton, Wash., graving dock, to Bethlehem Steel Co., through Maceo Construction Co., Clearwater, Cal., and Case Construction Co., San Pedro, Cal., joint contractors.
- 700 Tons, Portland, Ore., St. Vincent's Hospital East, to Truscon Steel Co., Portland, through Ross B. Hammond Co., Portland, contractor.
- 493 Tons, Rutledge, Tex., Marshall Ford Dam (Invitation A-46802), to Colorado Fuel & Iron Corp., Denver.
- 117 Tons, Orleans, Cal., Klamath River Bridge, to Soule Steel Co., San Francisco, through C. W. Caletti, San Rafael, Cal., contractor.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

- 1000 Tons, Lowell, Mass., housing project; previously reported 300 tons.
- 800 Tons, Fall River, Mass., housing project.
- 110 Tons, Bridgeton, N. J., Deerfield Packing Co.
- 116 Tons, New Hartford, Conn., State road.
- 200 Tons, Rego Park, N. Y., Forest Hills High School; bids Nov. 17.
- 100 Tons, Philadelphia, Charles Lennig building.

SOUTH AND CENTRAL

- 500 Tons, Chicago, subway, section D-6-B; bids Nov. 22.
- 260 Tons, Zanesville, Ohio, housing project; W. J. Paul & Adams Bros. Construction Co., general contractor.
- 115 Tons, Washington County, Ohio, bridge, Marietta and Warren townships; bids Nov. 17.
- 115 Tons, State of Arkansas, two highway bridges; bids Nov. 28.
- 115 Tons, Chicago, North State Street approaches.
- 110 Tons, Roby, Ind., American Maize Products Co.
- 100 Tons, Medina and Summit Counties, Ohio, State project No. 246; bids Nov. 17.

WESTERN STATES

- 532 Tons, San Diego, Cal., Washington Street Bridge; bids Nov. 30.
- 350 Tons, Berkeley, Cal., high school commercial buildings; bids in.
- 268 Tons, Issaquah, Wash., bridges on State Highway 2; bids Nov. 21.
- 212 Tons, Visalia, Cal., junior college buildings; bids in.
- 152 Tons, Factoria, Wash., highway separation bridges on State Highway 2; bids Nov. 21.

CANAL ZONE

- 1450 Tons, Panama Canal, Schedule 3709; bids taken.

NON-FERROUS...

Buying expands somewhat during week; consumption continues at peak rates . . . Spelter sales total 4100 tons . . . November lead shipments may reach 66,000 tons.

NEW YORK, Nov. 14—A moderate increase in copper buying was recorded in the past week, but scarcity of nearby supplies continues to restrict sales. Producers are still quoting 12.50c. per lb., Connecticut Valley, but are unable to offer metal for early shipment. In the open market prompt copper brought up to 13.25c. in the past week. The export copper market was fairly active all week at 13c. per lb., f.a.s. There is still no apparent let-down in copper fabricating activities. Many plants are booked to capacity for the next three months and are operating three shifts a day. The strike at the

Perth Amboy plant of American Smelting & Refining Co. was settled last week and operations have been resumed. Availability of supplies from this source will assist somewhat in relieving the tightness in spot positions.

Zinc

Sales last week were 4100 tons as compared with 3800 in the previous week, and shipments were 6400 against 8400 tons. Consumption is being maintained at a high rate and apparently little metal is going into stock piles in the raw state. Prime Western metal is being offered more freely for January and beyond but

prompt supplies are not as plentiful as some consumers desire. Quotations remain unchanged at 6.89c. per lb., New York.

Lead

Buying in the past week was at a very orderly pace, with no observable pressure to either buy or sell, and most producers were able to dispose of their intakes. Chief demand is for December positions, but occasional carlots of November metal are still being booked. With the resumption of operations at the Perth Amboy smelter, trade sources are predicting that November shipments may go above 66,000 tons, despite the usual tendency for deliveries to slacken in November as the inventory season approaches. October shipments may exceed 60,000 tons. Prices are very firm and unchanged at 5.50c. per lb., New York.

Tin

A good demand for both spot and futures persists but difficulty of importing adequate supplies still retards trading. Some of the spot demand is being accommodated by consumers switching metal on hand for future contracts, but here again uncertainty surrounding future supplies is hindering trade. Prompt Straits were nominally somewhat lower last week, but the absence of consistent selling practices renders it difficult to properly appraise the daily market. Threat of a possible German invasion of Holland has created some apprehension regarding safety of tin sources in East Indies. The Federal Procurement Division is taking bids on 400,000 lb. of tin for delivery at Columbus, Ohio, Baltimore or New York. This is in addition to 1,120,000 lb. purchased a short time ago.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Nov. 8	Nov. 9	Nov. 10	Nov. 13	Nov. 14
Copper, Electrolytic ¹	12.50	12.50	12.50	12.50	12.50
Copper, Lake	12.50	12.50	12.50	12.50	12.50
Tin, Straits, New York	Nominally 51.00c. all week				
Zinc, East St. Louis ²	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis ³	5.35	5.35	5.35	5.35	5.35

¹ Delivered Conn. Valley. Deduct ¼c. for New York delivery. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Prices

Cents per lb., Delivered

	New York	Cleveland
Tin, Straits pig	53.00c.	Nominal
Copper, Lake	13.75c.	Nominal
Copper, electro	13.50c.	Nominal
Copper, castings	13.125c.	Nominal
*Copper sheets, hot-rolled	20.87c.	20.87c.
*Yellow brass sheets ..	19.06c.	19.06c.
*Seamless brass tubes ..	21.81c.	21.81c.
*Seamless copper tubes ..	21.37c.	21.37c.
*Yellow brass rods	15.23c.	15.23c.
Zinc slabs	7.875c.	8.125c.
Zinc sheets, No. 9 casks	12.00c.	12.10c.
Lead, American pig ...	6.50c.	6.125c.
Lead, bar	8.95c.	8.75c.
Lead, sheets, cut	8.50c.	8.50c.
Antimony, Asiatic	16.00c.	17.00c.
Alum., virgin, 99 per cent plus	21.50c.	22.50c.
Alum., No. 1 remelt, 98 to 99 per cent	19.00c.	19.50c.
Solder, ½ and ½	2.25c.	Nominal
Babbitt metal, commercial grade	Nominal	Nominal

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33¼; on brass sheets and rods, 40; on brass tubes, 33¼, and copper tubes, 40.

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible...	10.125c.	10.75c.
Copper, hvy. and wire..	9.125c.	9.50c.
Copper, light and bottoms	8.125c.	8.625c.
Brass, heavy	5.50c.	6.00c.
Brass, light	4.625c.	5.375c.
Hvy. machine composition	9.25c.	10.125c.
No. 1 yel. brass turnings	5.25c.	5.75c.
No. 1 red brass or compos. turnings	9.125c.	9.625c.
Lead, heavy	4.375c.	4.75c.
Cast aluminum	8.75c.	9.75c.
Sheet aluminum	14.75c.	15.75c.
Zinc	3.375c.	4.625c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICK-SILVER, \$140 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.75c. a lb.

Building Aids Pump Output

EFFICIENCY of production of fuel pumps and injectors, which comprise the exclusive fuel system of the Cummins diesel engine, has increased materially as the result of the transfer of the manufacture of these precision parts to a new one-story rigid frame building, the Cummins Engine Co., Columbus, Ind., reports. The new building, designed and erected by the Austin Co., Cleveland, contributes to high working efficiency by an even distribution of daylight through sawtooth monitors, continuous side wall sash and clear glass partitions. An installation of combination mercury vapor-mazda lighting units insures a minimum of 70 foot-candles at the working plane.

IRON AND STEEL SCRAP

... Decline of 80c. in the composite price to \$19.83 reflects softness in markets.

NOV. 14.—Except at Cleveland, mill buying is light and the market tone is softer, resulting in declines in quotations in most districts. At Cleveland, however, a mill sale involving 15,000 to 20,000 tons of No. 1 steel has pushed quotations there up 50c. a ton on steel making grades. Sales at Philadelphia, on the other hand, have depressed the market there as much as \$1 on leading items, and the top price for No. 1 steel is off \$1 at Chicago on the basis of a small mill sale, lowering the whole list 50c. Substantial buying is still being withheld at Pittsburgh, but judging by small sales early this week, the average price for No. 1 is down 25c. As a result, the composite price for No. 1 is down 80c. from last week, to \$19.83, making a total drop of \$2.67 from the high point of the average of \$22.50, reached on Oct. 3.

In other districts, prices are either drifting downward or are stationary. Another sale of No. 2 steel was made at St. Louis, again below the previous buy by this particular mill, depressing buying prices 50c. on steel making grades. Cincinnati dealers have also lowered buying prices 50c. although the only activity is in covering current commitments. Boston prices reflect weakness in other districts, with the exception of export prices, which are stronger.

Pittsburgh

The market is again softer this week and although small sales of No. 1 heavy melting into consumption have been made, consumers still appear to be holding off purchases. Lower realized prices on railroad material have also had a softening effect. No. 1 heavy melting steel has been sold into consumption in the past week at \$21.50 a ton and brokers are not running into too much difficulty filling these small orders at \$21. In some cases brokers have been able to pick up odd cars at less than \$21 a ton. No. 1 steel is quotable this week at \$21 to \$21.50, down 25c. a ton from last week's average. Heavy melting on the Pennsylvania list is understood to have gone east to a consumer at \$22.50 a ton, but a small portion is reported to have reached this district. Railroad heavy melting is quotable this week at \$22 to \$22.50, down 25c. a ton from last week's average. Machine shop turnings and cast grades are quotably weaker.

Philadelphia

Easier tendencies were in evidence here again in the past week as the

flow of material from the yards reached proportions where further restrictions were put in force at several points. Several purchases of steel making grades, including one fairly large lot of No. 2 steel, have been made recently at prices running from 50c. to \$1 below previous levels. There has also been some activity in the cast grades at lower levels, and still lower prices are intimated by offerings of heavy breakable made in the past few days at prices as much as \$1 below the present quotation. Buying for a cargo for Japan is being done in the neighborhood of \$19 for No. 2 steel and \$20.50 for No. 1. The greater flow of scrap from the yards over the past 10 days is said to represent the crest of the movement inspired by the high prices of September.

Cleveland

A fair size mill sale of No. 1 heavy melting, mixed auto scrap and No. 1 bundles and blast furnace grades, reported to involve around 15,000 to 20,000 tons, at slightly higher than last week's published quotations, has not tightened the market here as much as might be expected. In recognition of the sale, No. 1 heavy melting is this week quoted up 50c. per ton at \$19.50 to \$20.

Youngstown

No. 1 heavy melting, quoted unchanged this week here at \$20.50 to \$21, may be slightly low if tested this week by a mill sale, but it is generally considered doubtful that the difference could be very great.

Buffalo

Despite reports of a sale made at \$21.50 during the past week scrap values remain unchanged. Sentiment among certain dealers indicated the possibility of a downward movement, but substantiating sales were lacking. High operating rates are being maintained at the mills and present scrap inventories are being rapidly consumed.

St. Louis

An East Side mill bought approximately 4000 tons of No. 2 heavy melting steel at 50c. a ton less than its preceding purchase, and dealer buying prices have been reduced 50c. on many items. However, the mills generally are inclined to coast along for the balance of 1939 on their present inventories and back orders. Railroad lists: Southern, 4700 tons; Chicago, Burlington & Quincy, 4600 tons; Louisville & Nashville, 2800 tons; Chicago, Milwaukee, St. Paul & Pacific, 1100 tons; Missouri Kansas-Texas, 600 tons; Chicago & Eastern Illinois, 300 tons.

Cincinnati

Lack of mill interest in the current market has brought a definite weak undertone to the district. Dealers have

accordingly reduced prices formally 50c. throughout the list, although in some instances there is a feeling that the prices may even be weaker. Dealer activity is confined to trading in small lots at attractive prices with some for application upon current commitments. Mill supplies are reported to be about equal to 60 to 90 days at present operations.

Detroit

Uncertainty about the exact status of the scrap market in the last week or so has given way to mild pessimism which is having a moderating effect on dealers' buying prices. However, this is partly due to the fact that sales into consumption have been absent and the additional fact that outside markets report weakness.

Boston

Demand for domestic delivery has quieted and prices are easier, shafting, blast furnace material and steel turnings being off 50c. a ton, and breakable cast 25c. New England foundry buying of machinery and textile cast is now largely in trucklots, and New England mill buying of Nos. 1 and 2 steel is hardly a market factor. In contrast, the export market continues active and is firmer. Two steamers will leave here this week and one from Providence. Other boats are awaiting loading berths. A Spanish freighter is loading here for Spain, the first Spanish vessel to visit Boston since before the Spanish civil war.

Toronto

Iron and steel scrap prices held firm during the week with no changes. Local dealers do not look for further revision of buying prices until about the close of the year when they can gain some idea of what the trend in finished steel materials may be. Recent advances, however, stimulated offerings and large tonnages of scrap now are appearing on the market.

Chicago

This market is curiously weak considering the fact that all but one mill are operating at over 100 per cent of capacity. On the basis of a direct purchase by a mill at \$17.75 this market is quoted at \$17.25 to \$17.75, though only a day or two before this sale another district mill paid \$18.50 to several brokers. Brokers are paying dealers \$17.25 and \$17.50 and for large tonnages up to 50c. more a ton. One large broker on Tuesday was offering dealers only \$17 while a leading mill was confident steel could be bought at \$17.50. The leading buyer and many foundries were out of the market the first of this week, which no doubt contributed to current softness. The recent sales involved relatively small tonnages.

New York

The local market is marking time and dealer buying prices are unchanged. No new export business has been placed, although adjustments on old contracts are being negotiated.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$21.00 to \$21.50
Railroad heavy melting	22.00 to 22.50
No. 2 heavy melting	19.50 to 20.00
Scrap rails	23.00 to 23.50
Rails 3 ft. and under	25.00 to 25.50
Comp. sheet steel	21.00 to 21.50
Hand bundled sheets	20.00 to 21.00
Heavy steel axle turn.	19.00 to 19.50
Machine shop turnings	14.00 to 15.00
Short shov. turnings	16.50 to 17.00
Mixed bor. & turn.	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Cast iron carwheels	21.00 to 21.50
Heavy breakable cast.	17.00 to 17.50
No. 1 cupola cast	21.00 to 21.50
RR. knuckles & coup.	26.00 to 26.50
Rail coil springs	26.00 to 26.50
Rail leaf springs	26.00 to 26.50
Rolled steel wheels	26.00 to 26.50
Low phos. billet crops	26.00 to 27.00
Low phos. punchings	25.00 to 25.50
Low phos. heavy plate	25.00 to 25.50
Railroad malleable	22.50 to 23.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$20.50 to \$21.00
No. 2 hvy. mltng. steel.	18.50 to 19.00
Hydraulic bund., new.	20.50 to 21.00
Hydraulic bund., old.	17.00 to 17.50
Steel rails for rolling	23.00 to 23.50
Cast iron carwheels	21.00 to 21.50
Hvy. breakable cast.	20.00 to 20.50
No. 1 cast	22.00 to 22.50
Stove plate (steel wks)	17.00 to 17.50
Railroad malleable	22.00 to 22.50
Machine shop turn.	13.50 to 14.00
No. 1 blast furnace	12.50 to 13.00
Cast borings	12.50 to 13.00
Heavy axle turnings	16.00 to 16.50
No. 1 low phos. hvy.	25.50 to 26.00
Couplers & knuckles	26.00 to 26.50
Rolled steel wheels	26.00 to 26.50
Steel axles	24.50 to 25.00
Shafting	24.50 to 25.00
Spec. iron & steel pipe	17.00 to 17.50
No. 1 forge fire	16.50 to 17.00
Cast borings (chem.)	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton	
Hvy. mltng. steel	\$17.25 to \$17.75
Auto. hvy. mltng. steel alloy free	16.50 to 17.00
No. 2 auto steel	13.50 to 14.00
Shoveling steel	17.25 to 17.75
Factory bundles	17.00 to 17.50
Dealers' bundles	16.00 to 16.50
No. 1 busheling	16.00 to 16.50
No. 2 busheling, old.	7.50 to 8.00
Rolled carwheels	20.50 to 21.00
Railroad tires, cut	20.75 to 21.25
Railroad leaf springs	20.00 to 20.50
Steel coup. & knuckles	20.00 to 20.50
Axle turnings	16.50 to 17.00
Coil springs	21.00 to 21.50
Axle turn. (elec.)	18.50 to 19.00
Low phos. punchings	21.50 to 22.00
Low phos. plates 12 in. and under	21.00 to 21.50
Cast iron borings	10.00 to 10.50
Short shov. turn.	11.50 to 12.00
Machine shop turn.	10.00 to 10.50
Rerolling rails	20.50 to 21.00
Steel rails under 3 ft.	21.00 to 21.50
Steel rails under 2 ft.	21.50 to 22.00
Angle bars, steel	20.50 to 21.00
Cast iron carwheels	16.75 to 17.25
Railroad malleable	20.50 to 21.00
Agric. malleable	16.50 to 17.00

Per Net Ton

Iron car axles	23.25 to 23.75
Steel car axles	21.50 to 22.00
Locomotive tires	16.50 to 17.00
Pipes and flues	13.50 to 14.00
No. 1 machinery cast.	15.50 to 16.00
Clean auto. cast	16.00 to 16.50
No. 1 railroad cast.	15.00 to 15.50
No. 1 agric. cast.	13.50 to 14.00
Stove plate	11.50 to 12.00
Grate bars	11.50 to 12.00
Brake shoes	13.00 to 13.50

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$20.50 to \$21.00
No. 2 hvy. mltng. steel.	19.00 to 19.50
Low phos. plate	23.50 to 24.00
No. 1 busheling	19.50 to 20.00
Hydraulic bundles	20.00 to 20.50
Machine shop turn.	12.50 to 13.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$19.50 to \$20.00
No. 2 hvy. mltng. steel.	18.50 to 19.00
Comp sheet steel	19.00 to 19.50
Light bund. stampings	15.50 to 16.00
Drop forge flashings	17.50 to 18.00
Machine shop turn.	12.00 to 12.50
Short shov. turn.	12.75 to 13.25
No. 1 busheling	18.25 to 18.75
Steel axle turnings	17.00 to 17.50
Low phos. billet and bloom crops	26.00 to 26.50
Cast iron borings	13.00 to 13.50
Mixed bor. & turn.	13.00 to 13.50
No. 2 busheling	13.00 to 13.50
No. 1 cupola cast	21.50 to 22.00
Railroad grate bars	14.50 to 15.00
Stove plate	14.50 to 15.00
Rails under 3 ft.	25.00 to 25.50
Rails for rolling	22.75 to 23.25
Railroad malleable	24.00 to 24.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	\$20.50 to \$21.00
No. 2 hvy. mltng. steel.	18.50 to 19.00
Scrap rails	21.00 to 21.50
New hvy. b'ndled sheets	18.50 to 19.00
Old hydraul. bundles	17.50 to 18.00
Drop forge flashings	18.50 to 19.00
No. 1 bushelings	18.50 to 19.00
Machine shop turn.	12.00 to 12.50
Shov. turnings	15.00 to 15.50
Mixed bor. & turn.	11.50 to 12.00
Cast iron borings	11.50 to 12.00
Knuckles & couplers	24.00 to 25.00
Coil & leaf springs	24.00 to 25.00
Rolled steel wheels	24.00 to 25.00
No. 1 machinery cast.	20.00 to 20.50
No. 1 cupola cast.	19.00 to 19.50
Stove plate	16.00 to 16.50
Steel rails under 3 ft.	23.50 to 24.00
Cast iron carwheels	21.00 to 21.50
Railroad malleable	21.50 to 22.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	\$18.00 to \$18.50
No. 1 hvy. melting	16.00 to 16.50
No. 2 hvy. melting	15.00 to 15.50
No. 1 locomotive tires	18.00 to 18.50
Misc. stand. sec. rails	17.50 to 18.00
Railroad springs	21.00 to 21.50
Bundled sheets	12.00 to 12.50
No. 1 busheling	14.00 to 14.50
Cast bor. & turn.	7.00 to 7.50
Machine shop turn.	7.50 to 8.00
Heavy turnings	13.50 to 14.00
Rails for rolling	19.50 to 20.00
Steel car axles	20.00 to 20.50
No. 1 RR. wrought	12.50 to 13.00
No. 2 RR. wrought	16.25 to 16.75
Steel rails under 3 ft.	21.00 to 21.50
Steel angle bars	20.00 to 20.50
Cast iron carwheels	20.00 to 20.50
No. 1 machinery cast.	18.00 to 18.50
Railroad malleable	17.50 to 18.00
No. 1 railroad cast.	16.00 to 16.50
Stove plate	12.00 to 12.50
Grate bars	10.50 to 11.00
Brake shoes	12.50 to 13.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	\$15.50 to \$16.00
No. 2 hvy. mltng. steel.	13.50 to 14.00
Scrap rails for mltng.	20.00 to 20.50
Loose sheet clippings	11.00 to 11.50
Hydrau. b'ndled sheets	15.00 to 15.50
Cast iron borings	5.50 to 6.00
Machine shop turn.	6.50 to 7.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	4.50 to 5.00
Rails for rolling	21.00 to 21.50
No. 1 locomotive tires	17.00 to 17.50
Short rails	22.50 to 23.00
Cast iron carwheels	17.00 to 17.50
No. 1 machinery cast.	18.50 to 19.00
No. 1 railroad cast.	17.00 to 17.50
Burnt cast	9.75 to 10.25
Stove plate	9.75 to 10.25
Agricul. malleable	15.00 to 15.50
Railroad malleable	18.00 to 18.50
Mixed hvy. cast.	16.00 to 16.50

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel	\$18.00
Scrap steel rails	20.00
Short shov. turnings	9.50
Stove plate	\$11.00 to 12.00
Steel axles	22.00
Iron axles	22.00
No. 1 RR. wrought	16.00
Rails for rolling	22.00 to 23.00
No. 1 cast	18.00
Tramcar wheels	18.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. ind.	\$16.00 to \$16.50
dustrial steel	15.50 to 16.00
No. 2 hvy. mltng. steel.	9.50 to 10.00
Borings and turnings	8.50 to 9.00
Long turnings	11.00 to 11.50
Short shov. turnings	16.00 to 16.50
No. 1 machinery cast.	17.50 to 18.00
Automotive cast	13.00 to 13.50
Hvy. breakable cast.	11.00 to 11.50
Stove plate	17.50 to 18.00
Hydraul. comp. sheets	15.00 to 15.50
New factory bushel.	12.50 to 13.50
Sheet clippings	14.50 to 15.00
Flashings	16.50 to 17.00
Low phos. plate scrap.	

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	\$16.50 to \$17.00
No. 2 hvy. mltng. steel.	13.50 to 14.50
Hvy. breakable cast.	16.50 to 17.00
No. 1 machinery cast.	16.50 to 17.50
No. 2 cast	15.50 to 16.00
Stove plate	13.50 to 14.50
Steel car axles	19.00 to 20.00
Shafting	19.00 to 20.00
No. 1 RR. wrought	14.00 to 15.00
No. 1 wrought long	12.50 to 13.00
Spec. iron & steel pipe	13.50 to 14.00
Rails for rolling	19.00 to 20.00
Clean steel turnings*	9.00 to 10.00
Cast borings*	8.00 to 9.00
No. 1 blast furnace	8.00 to 9.00
Cast borings (chem.)	Nominal
Unprepared yard scrap	9.50 to 10.90
Light iron	5.00 to 5.50
Per gross ton, delivered local foundries:	
No. 1 machin. cast.	\$20.00 to \$22.00
No. 2 cast	18.50 to 19.00

* \$1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton

Breakable cast	\$14.50 to \$14.75
Machine shop turn.	8.25 to 8.75
Mixed bor. & turn.	7.00 to 7.25
Bun. skeleton long	12.50 to 12.75
Shafting	18.75 to 19.75
Cast bor. chemical	9.50 to 10.00
Per gross ton delivered consumers' yards:	
Textile cast	\$18.00 to \$13.75
No. 1 machine cast	18.00 to 18.75
Per gross ton delivered dealers' yards:	
No. 1 hvy. mltng. steel.	\$16.00 to \$16.50
No. 2 steel	15.00 to 15.50

PACIFIC COAST

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	\$16.00 to \$17.50
No. 2 hvy. mltng. steel.	15.00 to 16.50

CANADA

Dealers' buying prices at these yards, per gross ton:

Toronto Montreal	
No. 1 hvy. mltng. steel.	\$11.25 \$10.75
No. 2 hvy. mltng. steel.	10.00 9.50
Mixed dealers steel	9.25 8.75
Drop forge flashings	10.25 9.75
New loose clippings	7.00 6.00
Busheling	5.50 5.00
Scrap pipe	8.00 7.50
Steel turnings	6.25 5.50
Cast borings	5.75 5.00
Machinery cast	13.00 17.50
Dealers cast	17.00 16.50
Stove plate	12.00 11.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges	
No. 1 hvy. mltng. steel.	\$17.00 to \$17.50
No. 2 hvy. mltng. steel.	15.50 to 16.50
No. 2 cast	15.00 to 15.50
Stove plate	13.50 to 14.50

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	\$18.50
No. 2 hvy. mltng. steel.	17.50
Rails (scrap)	\$18.50 to 18.75
Philadelphia, delivered alongside boats, Port Richmond.	
No. 1 hvy. mltng. steel.	\$20.25 to \$20.50
No. 2 hvy. mltng. steel.	19.00 to 19.25

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Re-rolling only). Prices delivered Detroit are \$2 higher. F.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton
Re-rolling \$34.90
Forging quality 40.90

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open hearth or bessemer \$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared 1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Gross Ton
Pittsburgh, Chicago or Cleveland \$43.00
Worcester, Mass. 45.00
Birmingham 43.00
San Francisco 52.00
Rods over 9/32 in. or 47/64 in., inclusive, \$5 a ton over base.

SOFT STEEL BARS

Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham 2.15c.
Detroit, delivered 2.25c.
Duluth 2.25c.
Philadelphia, delivered 2.47c.
New York 2.49c.
On cars dock Gulf ports 2.50c.
On cars dock Pacific ports 2.75c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham 2.15c.
On cars dock Tex. Gulf ports 2.50c.
On cars dock Pacific ports 2.75c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt. 2.15c.
Detroit, delivered 2.25c.
On cars dock Tex. Gulf ports 2.50c.
On cars dock Pacific ports 2.50c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham 2.15c.
Detroit, delivered 2.25c.
On cars dock Tex. Gulf ports 2.50c.
On cars dock Pacific ports 2.50c.

IRON BARS

Chicago and Terre Haute 2.15c.
Pittsburgh (refined) 3.60c.

COLD FINISHED BARS AND SHAFTING*

Pittsburgh, Buffalo, Cleveland, Chicago, and Gary 2.65c.
Detroit 2.70c.

* In quantities of 20,000 to 39,999 lb.

PLATES

Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del. 2.10c. to 2.35c.

Philadelphia, del'd 2.15c. to 2.40c.
New York, del'd 2.29c. to 2.54c.
On cars dock Gulf ports 2.45c.
On cars dock Pacific ports 2.60c.
Wrought iron plates, P'tg. 3.80c.

FLOOR PLATES

Pittsburgh or Chicago 3.35c.
New York, del'd 3.71c.
On cars dock Gulf ports 3.70c.
On cars dock Pacific ports 3.95c.

STRUCTURAL SHAPES

Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham 2.10c.
Philadelphia, del'd 2.215c.
New York, del'd 2.27c.
On cars dock Gulf ports 2.45c.
On cars dock Pacific ports 2.70c.

STEEL SHEET PILING

Base per Lb.
Pittsburgh, Chicago or Buffalo 2.40c.
On cars dock Gulf ports 2.85c.
On cars dock Pacific ports 2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill
Standard rails, heavier than 60 lb., per gross ton \$40.00
Angle bars, per 100 lb. 2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton \$40.00
Light rails (from rail steel) per gross ton 39.00

Base per Lb.
Cut spikes 3.00c.
Screw spikes 4.55c.
Tie plates, steel 2.15c.
Tie plates, Pacific Coast ports 2.25c.
Track bolts, to steam railroads 4.15c.
Track bolts to jobbers, all sizes (per 100 counts) 65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled

Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago 2.00c.
Detroit, delivered 2.10c.
Philadelphia, delivered 2.17c.
Granite City 2.10c.
On cars dock Pacific ports 2.50c.
Wrought iron, Pittsburgh 4.10c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago 3.05c.
Detroit, delivered 3.15c.
Granite City 3.15c.
Philadelphia, delivered 3.37c.
On cars dock Pacific ports 3.65c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

From May 10 up to and including May 15, reductions from the base price of hot and cold rolled sheets running from \$4 to \$8 a ton were prevalent. Concessions withdrawn, on May 15.

Subsequent to May 15, many orders originally placed at \$4 to \$8 below the base price were adjusted to the full \$8 concession.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham 3.50c.
Philadelphia, del'd 3.67c.
Granite City 3.60c.
On cars dock Pacific ports 4.00c.
Wrought iron, Pittsburgh 6.10c.

Electrical Sheets

(F.o.b. Pittsburgh)

Base per Lb.
Field grade 2.20c.
Armature 3.55c.

Electrical 4.05c.
Motor 4.95c.
Dynamo 5.65c.
Transformer 72 6.15c.
Transformer 65 7.15c.
Transformer 58 7.65c.
Transformer 52 8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary 3.80c.
F.o.b. cars dock Pacific ports 4.50c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland 3.35c.
Detroit, del'd 3.45c.
Granite City 3.45c.
On cars dock Pacific ports 3.95c.

TIN MILL PRODUCTS

*Tin Plate

Per Base Box*
Standard cokes, Pittsburgh, Chicago and Gary \$5.00
Standard cokes, Granite City 5.10

* Prices effective Nov. 10 on shipments through first quarter of 1939.

Special Coated Manufacturing Ternes

Per Base Box
Granite City \$4.40
Pittsburgh or Gary 4.50

Roofing Terne Plate

(F.o.b. Pittsburgh per Package, 112 sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

Black Plate, 29 gage and lighter

Pittsburgh, Chicago and Gary 3.05c.
Granite City 3.15c.
On cars dock Pacific ports, boxed 4.00c.

HOT ROLLED STRIP

(Widths up to 12 in.)

Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham 2.00c.
Detroit, delivered 2.10c.
On cars dock Pacific ports 2.60c.

Cooperage Stock

Pittsburgh & Chicago 2.10c.

From May 10 up to and including May 15, reductions in the base price of hot rolled strip running from \$4 to \$8 a ton were prevalent.

Concessions withdrawn on May 15. Subsequent to May 15, many orders originally placed at \$4 to \$8 below the base price were adjusted to the full \$8 concession.

COLD ROLLED STRIP*

Base per Lb.
Pittsburgh, Youngstown or Cleveland 2.80c.
Chicago 2.90c.
Detroit, delivered 2.90c.
Worcester 3.00c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland 2.95c.
Detroit, delivered 3.05c.
Worcester 3.35c.

From May 10 up to and including May 15, reductions from the base price of cold rolled strip amounting to \$4 a ton were prevalent. Concessions withdrawn on May 15.

COLD ROLLED SPRING STEEL

Pittsburgh and Cleveland Worcester

Carbon	0.26-0.50%	2.80c.	3.00c.
Carbon	0.51-0.75	4.30c.	4.50c.
Carbon	0.76-1.00	6.15c.	6.35c.
Carbon	1.01-1.25	8.35c.	8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	\$2.55
Coated nails	2.55
Cut nails, carloads	3.70

	Base per 100 Lb.
Annealed fence wire	\$2.90
Galvanized fence wire	3.30
Twisted barbless wire	3.40
Woven wire fence, No. 11 and heavier, base col.	70
Woven wire fence, lighter than No. 11, base col.	67
Single loop bale ties, base col.	56
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool	\$2.70
Stand. 2 pt., 12.5 gage barbed hog wire, per 80 rod spool	\$2.88

Note: Birmingham base same on above items, except spring wire.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
F.o.b. Pittsburgh only on wrought iron pipe.

Steel		Wrought Iron	
In.	Black Galv.	In.	Black Galv.
1/4	56 36	1/4 & 3/8	+9 +30
1/2	59 43 1/2	1/2	24 6 1/2
3/4	63 1/2 54	3/4	30 13
1	66 1/2 60 1/2	1 & 1 1/4	34 19
1 1/4	68 1/2 60 1/2	1 1/2	38 21 1/2
2		2	37 1/2 21

Lap Weld		Butt weld, extra strong, plain ends	
In.	Black Galv.	In.	Black Galv.
2	61 52 1/2	1/4 & 3/8	+10 +43
2 1/2	64 55 1/2	1/2	25 9
3 1/2	66 57 1/2	3/4	31 15
7	8.65 55 1/2	1 to 2	38 22 1/2
9 & 10.64 1/2	55		
11 & 12.63 1/2	54		

Lap weld, extra strong, plain ends		Butt weld, extra strong, plain ends	
In.	Black Galv.	In.	Black Galv.
2	59 51 1/2	1/4 & 3/8	+10 +43
2 1/2	63 55 1/2	1/2	25 9
3 1/2	66 57 1/2	3/4	31 15
7	8.65 55 1/2	1 to 2	38 22 1/2
9 & 10.64 1/2	55		
11 & 12.63 1/2	54		

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount of \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 8 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. (Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless	Lap Weld
	Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G. \$9.01	13 B.W.G. \$7.82
1 1/4 in. o.d.	13 B.W.G. 10.67	13 B.W.G. 9.26
1 1/2 in. o.d.	13 B.W.G. 11.70	13 B.W.G. 10.23
1 3/4 in. o.d.	13 B.W.G. 13.42	13 B.W.G. 11.64
2 in. o.d.	13 B.W.G. 15.03	13 B.W.G. 12.38
2 1/4 in. o.d.	13 B.W.G. 16.76	13 B.W.G. 14.54
2 1/2 in. o.d.	12 B.W.G. 18.45	12 B.W.G. 16.01
2 3/4 in. o.d.	12 B.W.G. 20.21	12 B.W.G. 17.54
3 in. o.d.	12 B.W.G. 21.42	12 B.W.G. 18.59
3 1/4 in. o.d.	12 B.W.G. 22.48	12 B.W.G. 19.50
3 1/2 in. o.d.	11 B.W.G. 28.37	11 B.W.G. 24.62
4 in. o.d.	10 B.W.G. 35.20	10 B.W.G. 30.54
4 1/2 in. o.d.	10 B.W.G. 43.04	10 B.W.G. 37.35
5 in. o.d.	9 B.W.G. 54.01	9 B.W.G. 46.87
6 in. o.d.	7 B.W.G. 82.93	7 B.W.G. 71.96

Extras for less carload quantities:	
	Base
40,000 lb. or ft. or over	5%
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	30%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago	\$54.80
6-in. and larger, del'd New York	52.20
*6-in. and larger, Birmingham	46.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	52.00
F.o.b. dock, Seattle	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.00
F.o.b. dock, Seattle	52.00

Class "A" and gas pipe, \$3 extra
4-in. pipe is \$3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$45, Birmingham, and \$53.80 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
1/2 in. and 6 in. and smaller	68 1/2
Larger and longer up to 1 in.	66
1 1/4 in. and larger	64
Lag bolts	66
Flow bolts, Nos. 1, 2, 3, and 7	68 1/2
Hot pressed nuts, and c.p.c. and t-nuts, square or hex. blank or tapped:	
1/2 in. and smaller	67
9/16 in. to 1 in. inclusive	64
1 1/4 in. and larger	62

On the above items with the exception of plow bolts, there is an additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts U.S.S. S.A.E.	
1/2 in. and smaller	67 70
9/16 to 1 in.	64 65
1 1/4 in. and larger	62 62

In full container lots, 10 per cent additional discount.

Stove bolts in packages, with nuts loose	72 1/2
Stove bolts in packages, with nuts attached, add 15% extra.	
Stove bolts in bulk	83 1/2
On stove bolts freight is allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.	

Large Rivets

(1/2 in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.40
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Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 10
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Cap and Set Screws

(Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.)

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled headless set screws, cut thread 1/4 in. and larger	64
3/16 in. and smaller	73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	70
Upset set screws, cup and oval points	75
Milled studs	52

Alloy Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, \$56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.	
Open-hearth grade, base	2.70c.
Delivered, Detroit	2.80c.
S.A.E.	
Series	Differential
Numbers	per 100 Lb.
200 (1/2% Nickel)	\$0.35

2100 (1 1/2% Nickel)	\$0.75
2300 (3 1/2% Nickel)	1.55
2500 (5% Nickel)	2.25
31 Nickel-chromium	0.70
3200 Nickel-chromium	1.85
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4340 Chr.-Ni.-Mo.	1.65
4345 Chr.-Ni.-Mo.	1.85
4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
6100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. base per lb. Delivered Detroit, 3.45c., carlots.

STAINLESS & HEAT RESISTANT ALLOYS

(Base prices, cents per lb. f.o.b. Pittsburgh)

Chrome-Nickel		No. 304	No. 302
Forging billets	21.25c.	20.40c.	
Bars	25c.	24c.	
Plates	29c.	27c.	
Structural shapes	25c.	24c.	
Sheets	36c.	34c.	
Hot-rolled strip	23.50c.	21.50c.	
Cold-rolled strip	30c.	28c.	
Drawn wire	25c.	24c.	

Straight Chrome

No.	No.	No.	No.
410	430	442	446
Bars 18.50c.	19c.	22.50c.	27.50c.
Plates 21.50c.	22c.	25.50c.	30.50c.
Sheets 26.50c.	29c.	32.50c.	36.50c.
Hot stp. 17c.	17.50c.	24c.	35c.
Cold stp. 22c.	22.50c.	32c.	52c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	Nominal
Tin plate, per base box	31s. to 32s.
Steel bars, open hearth	Nominal
Beams, open hearth	Nominal
Channels, open hearth	Nominal
Angles, open hearth	Nominal
Black sheets, No. 24 gage	Nominal
Galvanized sheets, No. 24 gage	Nominal

CONTINENTAL

Per Gross Ton, Gold £,
f.o.b. Continental Ports

Billets, Thomas	Nominal
Wire rods, No. 5 B.W.G.	£5 10s.
Steel bars, merchants	£5 5s.
Sheet Bars	Nominal
Plate 1/4 in. and up	£5 7s.
Plate 3/16 in. and 5 mm.	£5 13s.
Sheet 1/4 in.	£5 9s. 6d.
Beams, Thomas	£4 18s.
Angles (Basic)	£4 18s.
Hoops and strip, base	£5 12s.

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$24.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	24.00
Delivered Brooklyn	26.50
Delivered Newark or Jersey City	25.53
Delivered Philadelphia	24.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown..	23.00
F.o.b. Buffalo	23.00
F.o.b. Detroit	23.00
Southern, delivered Cincinnati.	23.06
Northern, delivered, Cincinnati.	23.44
F.o.b. Duluth	23.50
F.o.b. Provo, Utah	21.00
Delivered, San Francisco, Los Angeles or Seattle	26.50
F.o.b. Birmingham*	19.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	\$23.50
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	23.50
F.o.b. Buffalo	22.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown..	22.50
Delivered Philadelphia	24.34
Delivered Canton, Ohio	23.89
Delivered Mansfield, Ohio	24.44
F.o.b. Birmingham	18.00

Bessemer

F.o.b. Buffalo	\$24.00
F.o.b. Everett, Mass.	25.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	25.00
Delivered Newark or Jersey City	26.53
Erie, Pa., and Duluth	24.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown ..	23.50
F.o.b. Birmingham	24.00
Delivered Cincinnati	24.11
Delivered Canton, Ohio	24.89
Delivered Mansfield, Ohio	25.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo....\$28.50

Gray Forge

Valley or Pittsburgh furnace..\$22.50

Charcoal

Lake Superior furnace

Delivered Chicago

Canadian Pig Iron

Per Gross Ton

Montreal

Foundry iron	\$27.50 base
Malleable	28.00 base
Basic	27.50 base

Toronto

Foundry iron	\$25.50 base
Malleable	26.00 base
Basic	25.50 base

On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....\$100.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....\$32.00

Domestic, 26 to 28%.....39.50

Electric Ferrosilicon

Per Gross Ton Delivered;

Lump Size

50% (carload lots, bulk)\$69.50*

50% (ton lots in 50 gal. bbl.).. 80.50*

75% (carload lots, bulk)126.00*

75% (ton lots in 50 gal. bbl.)..139.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio

Per Gross Ton

10.00 to 10.50%.....\$32.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, \$1 per ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to

5.50%

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered

Carlots, Lump Size, on Contract

4 to 6% carbon

2% carbon

1% carbon

0.10% carbon

0.06% carbon

Silico-Manganese

Per Gross Ton, Delivered, Lump

Size, Bulk, on Contract

8% carbon

2.50% carbon

2% carbon

1% carbon

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads.... \$2.00

Ferrotungsten, 100 lbs. and less 2.25

Ferrovandium, contract, per

lb. contained V., delivered

.....\$2.70 to \$2.90†

Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots

.....\$2.25†

Ferrocobalt, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract

per net ton

.....\$142.50

Ferrocobalt, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract,

per net ton

.....\$157.50

Ferrophosphorus, electric, or blast furnace material, in

carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unit-

age, freight equalized with Rockdale, Tenn., per gross

ton

.....\$58.50

Ferrophosphorus, electrolytic

23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn.,

24%, per gross ton, \$3 unit-

age, freight equalized with Nashville

.....\$75.00

Ferromolybdenum, per lb. Mo.

f.o.b. furnace

.....95c.

Calcium molybdate, per lb.

Mo. f.o.b. furnace

.....80c.

Molybdenum oxide briquettes

48-52% Mo; per lb. contained Mo. f.o.b. Langloeth,

Pa.

.....80c.

* Spot prices are \$5 per ton higher.

† Spot prices are 10c. per lb. of contained element higher.

*ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%...\$5.25

Old range, non-Bessemer, 51.50% 5.10

Messabi, Bessemer, 51.50%..... 5.10

Messabi, non-Bessemer, 51.50% 4.95

High phosphorus, 51.50% 4.85

Foreign Ores*

C.A.F. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55

to 58% dry, Algeria

.....12c.

Iron, low phos., Swedish, average, 68½% iron

.....12c.

Iron, basic or foundry, Swedish, aver. 65% iron..... 11c.

Iron, basic or foundry, Russian, aver. 65% iron.....Nominal

Man., Caucasian, washed

52%

.....44c.

Man., African, Indian,

44-48%

.....43c.

Man., African, Indian,

49-51%

.....45c.

Man., Brazilian, 46 to

48%

.....40c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite,

duty paid, delivered.\$23.00 to \$24.00

Tungsten, domestic, scheelite

delivered

.....25.00

Chrome or (lump) c.i.f. Atlantic

Seaboard, per gross

ton: South African

(low grade)

.....\$17.00

Rhodesian, 45%

.....21.00

Rhodesian, 48%

.....25.00

Turkish, 48-49% 26.00

Turkish, 45-46% 23.00

Turkish, 40-41% 18.50

Chrome concentrates (Turkish) c.i.f.

Atlantic Seaboard, per gross ton:

50%

.....\$26.00

48-49%

.....25.00

* All foreign ore prices are nominal

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5,

f.o.b. Kentucky and Illinois

mines, all rail

.....\$22.00

Domestic, f.o.b. Ohio River

landing barges

.....\$22.00

No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines.\$20.00 to 22.00

Foreign, 85% calcium fluoride,

not over 5% silicon, c.i.f.

Atlantic ports, duty

paid

.....\$22.50 to \$23.50

Domestic No. 1 ground bulk, 96

to 98%, calcium fluoride, not

over 2½% silicon, f.o.b. Illinois and Kentucky

mines

.....\$31.60

FUEL OIL

Per Gal.

No. 2, f.o.b. Bayonne, N. J....4.375c.

No. 6, f.o.b. Bayonne, N. J.... 2.74c.

No. 5 Bur. Stds., del'd Chicago 3.25c.

No. 6 Bur. Stds., del'd Chicago 2.75c.

No. 3 distillate, del'd Cleve'd. 5.375c.

No. 4 industrial, del'd Cleve'd. 5.125c.

No. 5 industrial, del'd Cleve'd. 4.25c.

No. 6 industrial, del'd Cleve'd. 4.00c.

COKE

Per Net Ton

Furnace, f.o.b. Connells-

ville, Prompt

.....\$5.00 to \$5.50

Foundry, f.o.b. Connells-

ville, Prompt

.....5.75 to 6.25

Foundry, by - product

Chicago ovens

.....10.50

Foundry, by - product

del'd New England....

.....12.50

Foundry, by - product

del'd Newark or Jersey

City

.....11.38 to 11.90

Foundry, by - product

Philadelphia

.....11.13

Foundry, by - product

delivered Cleveland ..

.....11.05

Foundry, by - product

delivered Cincinnati ..

.....10.50

Foundry, Birmingham..

.....7.50

Foundry, by - product

del'd St. Louis industrial

district

.....10.75 to 11.00

Foundry, from Birmingham,

f.o.b. cars dock

Pacific ports

.....14.75

... OBITUARY ...

WILLIAM J. HANLEY, commercial vice-president of the General Electric Co., with headquarters in Cleveland, died in that city on Nov. 9, aged 72 years. He had been identified with the company for 51 years, having begun service with it in 1888 as a construction foreman.



JAMES P. WALSH, coal and shipping executive at Cleveland and Pittsburgh before his retirement 15 years ago, died Nov. 6 in Shaker Heights, Ohio. He was 80 years old. Mr. Walsh was for 30 years vice-president of the Pittsburgh Coal Co. In the World War he was vice coal administrator for the United States.

He also was former president of General Coal Co., Pittsburgh, secretary-treasurer of the Carnegie Metals Co., Pittsburgh, general sales manager of M. A. Hanna Co., and on the boards of the Midland Steamship Line, Inc., and the Pioneer Steamship Co.



WILLIAM A. DAIL, manager of the National Lead Co. died in Cincinnati, Nov. 5, aged 69 years. Mr. Dail had been associated with the lead company for 41 years and went to Cincinnati in 1918 as sales manager.



T. L. MCGLACHLIN, 64, for several years a representative in northwestern Wisconsin for the Northfield (Minn.)

Iron Co., died of heart disease. He was 64 years old.



WELLINGTON C. MAC EWEN, for 30 years a consulting engineer for the Allis-Chalmers Mfg. Co., Milwaukee, died at his home in New Rochelle, N. Y. During his association with Allis-Chalmers, Mr. Mac Ewen operated through the New York offices of the Milwaukee firm. He retired about four years ago. He was 83 years old.



FRANK B. SWEET, purchasing agent for Swedish Crucible Steel Co., Detroit, died Nov. 1, after a four-day illness.



HARRY R. KEEVER, purchasing agent for Commonwealth Brass Co., Detroit, died on Nov. 4 of a heart attack while he was recuperating from pneumonia. Mr. Kever was born in Richmond, Ind., in 1882 and went to Detroit in 1903.



MATHIAS F. CUNNINGHAM, president of the Waltham Grinding Co., Waltham, Mass., died of a heart attack at his home in that city on Nov. 6. He was born in Waltham 66 years ago and was educated in the city schools.



JOHN WILLIAM MORTON, an engineer for the Ternstedt Mfg. Co., division of General Motors Corp., was buried Nov. 7 at Detroit. He was born in Waterbury, Conn., and had lived in Detroit for 16 years.

Industry in U. S. Reported Ignoring Buyers in Mexico

MEXICO CITY—Some manufacturers in the United States have refused to reply to telegrams and urgent air mail inquiries from Mexican buyers, despite the war-made opportunity for the United States to capture much of the \$55,000,000 business heretofore placed yearly by Mexico with European companies, H. O. Johnson, secretary of the American Chamber of Commerce of Mexico, declared this week in a letter to THE IRON AGE.

"It is most unfortunate that the average manufacturer in the United States is either held up by stockholders or management from developing export business," he said. "One way to put the American unemployed back to work would be to appreciate

the possibilities of such business," he said.

U. S. exports to Mexico jumped to 70 per cent of the total shipped into that country when the World War began in 1914 and as the war continued rose to 90 per cent. From 1934 to 1937, U. S. exports to Mexico averaged 50 per cent of the total, Mr. Johnson said.

O. Smalley to Head Meehanite Founders

O. SMALLEY, president of Meehanite Metal Corp., Pittsburgh, was re-elected president of the Meehanite Research Institute of America at the annual meeting of the organization, held Nov. 1 to 3 at Detroit. H. B. Hanley, American Laundry Machinery Co., Rochester, N. Y., and F. M. Robbins, Ross-Meehan Foundry,

Chattanooga, Tenn., were re-elected vice-president and secretary-treasurer respectively.

The meeting was attended by 93 Meehanite licensees and more than 50 papers describing results of research into the metallurgy and foundry technique of Meehanite casting were read.

U. S. Ordnance Orders Total \$70,000,000

CHICAGO—The urgent need for industrial cooperation in the current ordnance program was stressed at a dinner last week of the Chicago post of the Army Ordnance Association by Major General Charles Wesson, chief of ordnance, United States Army. General Wesson pointed out that industrial concerns have been given orders for bomb bodies, light tanks, semi-automatic rifles, gun carriages, and mechanical fuses amounting to about \$70,000,000. Since July 1, he said, 280 contracts have been placed. One obstacle not commonly known in the manufacture of ordnance, the general emphasized, is that about two years are generally required on most contracts between the time the money is appropriated and actual production begins. Aside from the time needed for tooling up a plant for a new product and acquiring the necessary jigs, fixtures and dies, the main factor in this delay is gaining experience in a new type of work.

It is because of this that the current program of educational orders and procurement planning has been inaugurated. Today 46 items have been ordered from 90 odd plants at a cost of around \$10,000,000. Many other plants have been assigned products to manufacture during war time and are familiar with the specifications, necessary equipment, production schedules and all other preliminary details.

Prior to the dinner meeting, Colonel Donald Armstrong, executive officer of the Chicago ordnance district, said that of the 14 ordnance districts only Philadelphia, with a billion dollars' worth of orders, would rank ahead of the Chicago area, where ordnance orders totaling about 640 million dollars for a two-year period would be released if the war time plan were invoked.

C. B. Cole, president, the Chicago chapter, American Society of Tool Engineers, commented on the current shortage of skilled labor and emphasized the need for more apprenticeship courses.

PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

Aviation Mfg. Corp., 420 Lexington Avenue, New York, military and commercial airplanes, aircraft engines and parts, etc., has plans by Albert Kahn, Inc., New Center Building, Detroit, architect and engineer, for new plant on Murfreesboro Road, near Berry Field municipal airport, Nashville, Tenn., where 36-acre tract has been acquired. Main unit will be one-story, 300 x 405 ft., for parts production and assembling, latter division to be 25 x 125 ft. Plant will include sandblast department, machine shops, electric heat-treating and processing division, experimental department, with storage and distributing divisions; mezzanine floors will be equipped for sub-assembling of various parts. A two-story administration building will be located on adjoining site, and smaller plant structures. Total floor area will approximate 150,000 sq. ft. Cost about \$1,000,000 with equipment, instead of smaller amount previously noted. Marr & Holman, Nashville, are associate architects.

Noma Electric Corp., 524 Broadway, New York, electric lamps and other electrical specialties, has purchased nine-story building at 55-61 West Thirteenth Street, about 100,000 sq. ft. floor space, for plant, removing from first noted location and providing large increased capacity.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Nov. 24 for 105,000 ft. of cable and 105 reels (Circular 142); until Nov. 29, mast bases, mast sections, shields, mounting plates, connectors, jacks, terminal blocks and other equipment (Circular 149).

General Electric Co., Schenectady, N. Y., has let general contract to James Stewart Corp., 343 South Dearborn Street, Chicago, for new six and seven-story and basement factory branch, storage and distributing plant at Chicago, to total 363,000 sq. ft. of floor space. Cost over \$1,500,000 with equipment. Holabird & Root, 333 North Michigan Avenue, Chicago, are architects.

Morey Machinery Co., Inc., 410 Broome Street, New York, machinery and parts, has filed plans for new one-story plant at 4-21 Twenty-sixth Avenue, Astoria, L. I. Cost close to \$40,000 with equipment. Simeon Heller, 39-22 Main Street, Flushing, L. I., is architect.

International Agricultural Corp., 61 Broadway, New York, plans new potash mill near Carlsbad, N. M., where company has leased about 15,000 acres of potash lands. Plant will comprise several one and multi-story units for crushing, grinding, flotation and other production divisions, with storage and distributing buildings, machine shop, power house and other mechanical departments. Equipment will be installed for processing potassium sulphate, potassium chlorides and allied products. Company also will build a mining plant on properties for raw material supply. Project will be carried out under direction of Union Potash & Chemical Co., Carlsbad, an affiliated organization. Cost close to \$2,500,000 with machinery.

Wright Aeronautical Corp., 132 Beckwith Avenue, Paterson, N. J., airplane engines and parts, has let contract to Truscon Steel Co., Youngstown, for one-story addition, about 300,000 sq. ft. of floor space, on adjoining tract. Cost close to \$1,000,000 with equipment.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Nov. 20 for 213,350 thumb nuts (Circular 613); until Nov. 27, one flotation tank for separation of tetryl and spent acid, two sedimentation tanks, one drown tank for acid tetryl and one sedimentation tank (Circular 587); until Nov. 29, hydraulic testing

machine with automatic stress strain recorder and accessories (Circular 596).

Welin Davit & Boat Corp., 8 Lister Avenue, Newark, N. J., marine life-saving equipment, etc., has acquired one-story building, about 40,000 sq. ft. of floor space at Perth Amboy, N. J., heretofore held by National Lead Co., including adjoining three-acre tract. Structure will be modernized for early occupancy by Alloy Fabricators, Inc., first noted address, a subsidiary, manufacturer of stainless and alloy steel products. Present fabricating plant will be removed to new location later.

Resinous Products & Chemical Co., 222 West Washington Square, Philadelphia, industrial chemicals, synthetic resins, etc., is asking bids on general contract for four-story addition to plant at Richmond and Kennedy Streets. Cost close to \$100,000 with equipment.

Philadelphia Electric Co., 1000 Chestnut Street, Philadelphia, has acquired plant property of Pennsylvania Salt Mfg. Co., Widener Building, at Delaware and Oregon Avenues, and will use as site for new steam-electric generating plant, designed for an ultimate capacity of 500,000-kw. It will be known as Southwark station, with total cost, including switching stations and transmission lines, estimated at \$45,000,000. Following relinquishment of present plant, Pennsylvania Salt company plans erection of another large works for replacement.

◀ BUFFALO DISTRICT ▶

Alco Products, Inc., Dunkirk, N. Y., oil refining equipment, steam specialties, etc., plans one-story addition. Cost close to \$60,000 with equipment. Company is a division of American Locomotive Co., New York.

National Gypsum Co., 190 Delaware Avenue, Buffalo, building products, has arranged for bond sale of \$5,000,000, of which about \$1,500,000 will be used for expansion in branch plant at East River and East 150th Street, New York, comprising several one-story units and new equipment. Entire project at plant will cost close to \$2,000,000.

Curtiss Aeroplane Division, Curtiss-Wright Corp., Vulcan and Kenmore Avenues, Buffalo, has let general contract to Darin & Armstrong, Inc., 2041 Fenkell Avenue, Detroit, for one-story addition, including two-story section for assembling division. Cost about \$230,000 with equipment.

◀ NEW ENGLAND ▶

Hanson-Whitney Machine Co., 169 Bartholomew Avenue, Hartford, Conn., metal-working machinery and parts, has let general contract to Bartlett-Brainerd Co., 16 Van Dyke Avenue, for four-story addition, 60 x 80 ft., including extensions in boiler plant. Cost over \$85,000 with equipment. John T. Henderson, 750 Main Street, is engineer.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Nov. 24 for 503 water chests (Circular 128).

United Illuminating Co., 128 Temple Street, New Haven, Conn., plans expansion and improvements in Steel Point steam-electric power plant, Bridgeport, Conn., on waterfront, including new 25,000-kw. steam turbine-generator unit, boilers and auxiliary equipment. Cost over \$2,000,000 with machinery. Westcott & Mapes, Inc., New Haven, is consulting engineer.

Lewis-Shepard Sales Corp., 125 Walnut Street, Watertown, Mass., lift trucks, portable cranes and other material-handling equipment, has let general contract to Somers Construction Co., 107 Massachusetts Avenue, Boston,

for one-story top addition to plant, 64 x 206 ft. Cost over \$45,000 with equipment.

Coca-Cola Bottling Co., Inc., 560 Edgewood Avenue, N. E., Atlanta, Ga., plans one-story mechanical-bottling plant on Middletown Avenue, New Haven, Conn. Cost over \$50,000 with equipment. Jesse Shelton, Atlanta, is architect.

◀ SOUTH ATLANTIC ▶

Florida Sugar Distributors, 82 N. E. Twenty-sixth Street, Miami, Fla., has leased one-story building to be erected at N. W. Thirteenth Street and Seventh Avenue, for new storage and distributing plant. Cost about \$60,000 with equipment. Bids have been asked on general contract. George Fink, 2128 Ponce de Leon Boulevard, Coral Gables, Fla., is architect.

City Council, Homestead, Fla., plans extensions and improvements in municipal power plant, including new 600-hp. diesel engine-generator unit and auxiliary equipment. Cost about \$75,000. Financing has been arranged through Federal aid.

Weaver Fertilizer Co., Norfolk, Va., plans new one-story branch plant near North Cherry Street Extension, Winston-Salem, N. C., 142 x 188 ft. Cost close to \$45,000 with conveying, loading and other mechanical-handling equipment.

◀ SOUTH CENTRAL ▶

Chattanooga Electric Power Board, Chattanooga, Tenn., will ask bids on general contract in December for new one-story electric service and operating building on 7-acre tract bounded by Holtzclaw and Greenwood Avenues, Oak and Fifth Streets, with machine and repair shop, meter service and repair division, equipment storage and distributing department and other mechanical units. One-story service and garage building for municipal motor trucks will be erected on adjoining site. Cost close to \$263,000, of which \$118,350 has been secured through Federal grant.

Gray & Dudley Co., 3103 Charlotte Avenue, Nashville, Tenn., manufacturer of stoves, ranges and parts, plans rebuilding part of plant recently destroyed by fire. Loss over \$125,000 with equipment.

Gulf, Mobile & Ohio Railroad Co., Mobile, Ala., has let general contract to Ingalls Iron Works Co., Birmingham, for one-story fruit storage and distributing building, to replace an existing old structure. Cost about \$250,000 with elevating, conveying and other mechanical-handling equipment.

Longino & Collins, Inc., 3625 Tulane Avenue, New Orleans, meat packer, has asked bids on general contract for new two-story packing plant on Airline Highway. Cost over \$60,000 with equipment. Carl F. Schloemann, 6329 San Bonita Avenue, St. Louis, is architect and engineer.

◀ WASHINGTON DIST. ▶

Assistant Director, Bureau of Prisons, Department of Justice, Washington, asks bids until Nov. 22 for two pneumatic rock drills for Danbury, Conn. (Circular 2116).

Baltimore & Ohio Railroad Co., Baltimore and Charles Streets, Baltimore, has asked bids on general contract for one-story building at Locust Point shops for storage and distribution. Cost close to \$40,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, has let general contract to Arundel Corp., Pier 2, Pratt Street, and Consolidated Engineering Co., 20 East Franklin Street, both Baltimore, for naval air base at San Juan, Puerto Rico, on joint bid of about \$7,500,000 exclusive of equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until Nov. 20 for steel flexible metallic conduit, copper cable, telephone cable, copper magnet wire, 60,000 ft. of copper wire, 15,000 ft. of cross-connecting wire, marine bells, pipe sleeves and other equipment (Schedule 3708); until Nov. 21, galvanized steel eye bolts, galvanized steel ring bolts, sheet-brass grommets, aluminum

gas-welding rods, 1500 lb. of manganese bronze welding rods, 800 lb. of steel welding rods, gas regulators, acetylene and hydrogen gas hose, industrial thermometers and other equipment (Schedule 3721).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 21 for 1½-in. galvanized plow steel wire rope (Schedule 7670) for Norfolk, Va., yard; general purpose shovels (Schedule 7637), hammers, chisels and files, and wood handles (Schedule 7630), brass and copper pipe and tubing (Schedule 7652), conduit pipe (Schedule 7627), vices (Schedule 7664), nippers and pliers (Schedule 7662), chisels and chisel blanks (Schedule 7647), rope shackles, anchor and thimbles (Schedule 7622), base rings and racks (Schedule 7653) for Eastern and Western navy yards.

Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has authorized further expansion in steam-electric generating station at Westport, where work is under way for an increase of 33,500-hp. in present capacity. New work will provide for installation of 67,000-hp. turbine-generator unit and accessories, high-pressure boilers and auxiliary equipment, scheduled for completion in 1941. Cost about \$4,500,000. Present expansion, to be completed next summer, will cost about \$3,600,000.

◀ SOUTHWEST ▶

Board of Public Service, City Hall, St. Louis, asks bids until Nov. 28 for boilers, stokers and auxiliary equipment for power house at Robert Koch Hospital (Contracts 5008 and 5009).

City Council, Tulsa, Okla., plans hangars with shop and reconditioning facilities, and other structures at new municipal airport on Yale Street, Fifty-first to Sixty-first Street, to replace present airport at Sheridan and Fifty-first Streets. Cost about \$100,000. John N. Armstrong is manager.

Consolidated Chemical Industries, Inc., Texas Division, Petroleum Building, Houston, Tex., plans one-story addition to branch plant at Bastrop, La. Cost close to \$55,000, of which about \$30,000 will be expended for equipment.

Commanding Officer, Ordnance Department, San Antonio Arsenal, San Antonio, Tex., asks bids until Nov. 27 for one lathe grinder, motor-driven precision grinder and motor-driven tilting arbor saw bench (Circular 24).

Alfred Power & Light Co., Alfred, Tex., recently organized, care of Rabey Funk, 1208 West Tenth Street, Amarillo, Tex., president, has approved plans for new local power plant for light and power distribution. Cost close to \$100,000 with equipment.

Pennsylvania Shipyard, Inc., Beaumont, Tex., plans expansion and improvements in shipbuilding and repair plant, including new shop units and equipment. Cost over \$175,000 with machinery.

◀ OHIO AND INDIANA ▶

Elyria Belting & Machinery Co., Williams Street, Elyria, Ohio, has let general contract to Henry Heldrich, Century Block, for one-story storage and distributing plant, 50 x 125 ft., to replace a structure recently destroyed by fire. Cost about \$45,000 with equipment. Milo S. Holdstein, 241 Euclid Avenue, is architect.

Owens-Corning Fiberglas Co., Ohio Building, Toledo, has asked bids on general contract for one-story addition to plant at Newark, Ohio, 125 x 200 ft., for storage and distribution. Cost over \$85,000 with mechanical handling and other equipment. Company is affiliated with Owens-Illinois Glass Co.

Chicago Pneumatic Tool Co., 1241 East Forty-ninth Street, Cleveland, has let general contract to Hadlock Krill Co., 2169 East Thirty-third Street, for two-story addition, 80 x 150 ft. Cost over \$60,000 with equipment.

Aeronautical Corp. of America, Inc., Lunken Airport, Cincinnati, monoplanes and other types of aircraft and parts, has asked bids on general contract for new one-story plant at

Middletown Airport, Middletown, Ohio, totaling about 50,000 sq. ft. of floor space, for parts production and assembling, with one-story adjoining structure for office and operating service. Cost about \$100,000 with equipment. Garriott & Becker, Times-Star Building, are architects; O. W. Motz, 920 East McMillan Street, is engineer, both Cincinnati.

Scherer Electric Co., 444 South Pennsylvania Street, Indianapolis, electrical equipment, plans new one-story factory, 110 x 125 ft., at 936 South West Street. Cost over \$60,000 with equipment. E. C. Doeppers, Rauh Building, is architect.

◀ WESTERN PA. DIST. ▶

Westinghouse Electric & Mfg. Co., East Pittsburgh, plans one-story addition to branch plant at Sharon, Pa., 160 x 165 ft. Cost over \$80,000 with equipment. M. L. Fawcett is manager of Sharon works.

Elk Refining Co., Charleston, W. Va., plans new bulk oil and gasoline marine loading and distributing plant on Elk River, near city, with steel tanks, pumping station and other facilities. Cost close to \$75,000 with equipment.

Kendall Refining Co., Bradford, Pa., has let general contract to C. E. Swanson, Bradford, for one-story addition to oil refinery. Cost over \$60,000 with equipment.

◀ MICHIGAN DISTRICT ▶

Tivoli Brewing Co., 10205 Mack Avenue, Detroit, has let general contract to F. H. Martin Construction Co., 955 East Jefferson Street, for five-story addition for storage and distribution. Cost over \$80,000 with equipment. Mildner & Eisen, Hammond Building, are architects.

L. A. Young Spring & Wire Corp., 9200 Russell Street, Detroit, steel springs and general wire goods, has approved plans for new one-story plant, about 65,000 sq. ft. of floor space, on 5-acre tract on Eglinton Avenue East, Leaside, Toronto, Ont., recently acquired. Cost over \$100,000 with equipment. Plant will be occupied by L. A. Young Industries, Ltd., 187 Geary Street, and Marshall Ventilated Mattress Co., Ltd., 24 Spadina Avenue, both Toronto, Canadian subsidiaries, which will expand capacities.

Active Tool & Mfg. Co., 852 Clairport Avenue, Detroit, tools and allied mechanical equipment, has approved plans for one-story addition, for which superstructure will be placed under way at once. Cost close to \$40,000 with equipment.

McInerney Spring & Wire Co., Grand Rapids, Mich., springs for automobile seats and other service, wire goods, etc., plans rebuilding part of plant recently destroyed by fire.

◀ MIDDLE WEST ▶

Great Lakes Spring Corp., 6401 West Sixty-fifth Street, Chicago, steel springs for automobile seats and other spring products, has approved plans for one-story addition, 179 x 218 ft. Cost close to \$100,000 with equipment.

Eureka X-Ray Tube Corp., 212 South Marion Street, Oak Park, Chicago, luminous tubes and other X-ray equipment, has let contract to Munao Brothers, 5034 School Street, and Power Construction Co., Oak Park, for new one-story plant, 91 x 120 ft., at 3252 Kilpatrick Avenue. Cost over \$65,000 with equipment. Morton L. Pereira, 100 West Monroe Street, is architect.

A. O. Smith Corp., 3533 North Twenty-seventh Street, Milwaukee, has let contract to Wisconsin Bridge & Iron Co., 5023 North Thirty-fifth Street, for one-story addition, 154 x 255 ft., for expansion in pipe-manufacturing division. Cost over \$100,000 with equipment.

Chicago & North Western Railway, 400 West Madison Street, Chicago, will take bids soon on general contract for one-story shop, 100 x 150 ft., at repair and construction plant at Council Bluffs, Iowa. Cost over \$60,000 with equipment.

Signal Corps Procurement District, 1819 West Pershing Road, Chicago, asks bids until Nov. 21 for five power units (Circular 80).

Pilsen Brewing Co., 3049 West Twenty-eighth Street, Chicago, has let general contract to Frank Sedlak's Sons, 6816 Riverside Drive, Berwyn, Ill., for two-story addition, 46 x 98 ft., for a mechanical-bottling unit. Cost about \$50,000 with equipment. Smith, Brubaker & Egan, 30 North LaSalle Street, are architects.

Standard Rendering Co., 635 Adams Street, Kansas City, Kan., manufacturer of tallow, grease, etc., will take bids soon for three plant additions, comprising main three-story production unit, one-story storage and distributing building, and boiler house with reinforced-concrete stack. Cost close to \$100,000 with equipment. M. H. Doyme, Railway Exchange Building, St. Louis, is consulting engineer.

Sivyer Steel Casting Co., Milwaukee, is spending \$50,000 for a new building to house its core room and stainless steel operations. It will replace original plant erected in 1910, and its first unit of a program which will be developed into a large foundry.

Ladish Drop Forge Co., Cudahy, Wis., is erecting a \$75,000 addition to its plant to house a heat treating department and machining operations.

◀ PACIFIC COAST ▶

Consolidated Aircraft Corp., 3302 Pacific Highway, San Diego, Cal., airplanes and parts, has asked bids for structural steel for new plant buildings on about 17-acre tract of city-owned tidewater property consisting of six one-story units, totaling 30 x 1000 ft., for final assembly shop, finishing shop, paint shop, seaplane boat shop, storage and distributing building, and boiler plant. A three-story office and administration building also will be built. Cost over \$350,000 with equipment. Edward C. and Ellis W. Taylor, 803 West Third Street, Los Angeles, are architect and engineer respectively.

Regal Amber Brewing Co., 675 T-eat Avenue, San Francisco, has let general contract to Louie Sartorio, 2627 Lombard Street, for one-story addition at Folsom and Twentieth Streets, for storage and distribution. Cost close to \$50,000 with equipment. R. A. Hanson, 608 Indiana Street, is consulting engineer.

Los Angeles Water and Power Bureau, 207 South Broadway, Los Angeles, has asked bids on general contract for one-story tool and equipment storage and distributing building, 64 x 72 ft., at Van Nuys, Cal. Installation will include two light-type cranes and other mechanical-handling equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 21 for three engine lathes (Schedule 7633), for San Pedro, Los Angeles, Naval Air Station, and Puget Sound Navy Yard, Bremerton, Wash.; medium heavy-duty engine lathes (Schedule 7641) for San Pedro station, all motor-driven; until Nov. 24, eight paint sprayers (Schedule 7677) for Puget Sound yard.

Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, is arranging fund of about \$25,000,000 for expansion and improvements in plants and system during 1940, including completion of two steam-electric generating stations, each 67,000-hp. capacity, now in course of construction in the Contra Costa County shore district, San Francisco Bay; work on another generating plant of like capacity, in same area; transmission and distributing lines, power substations and switching stations, shops and miscellaneous structures.

Western Brass Works, Inc., 1460 Naud Street, Los Angeles, brass and bronze products, has let general contract to Dick Building Co., 3710 West Washington Boulevard, for one-story addition, 100 x 150 ft. Cost close to \$45,000 with equipment. John M. Cooper, 523 North Bedford Drive, Beverly Hills, is architect.

Santa Maria Airlines, Inc., Santa Maria Airport, Santa Maria, Cal., has filed plans for new hangar unit, with shop and repair facilities. Cost close to \$40,000 with equipment.

THIS WEEK'S MACHINE ... TOOL ACTIVITIES ...

... Foreign orders gain in volume ... French are in the lead, buying equipment largely for aircraft manufacture ... Domestic sales continue at a high level ... Long deliveries shifting market to secondary sellers.

Substantial Foreign Orders Placed Last Week

CINCINNATI—Machine tool demand in this area took on a trifle brisker appearance during the past week. An analysis of the demand indicates that export business is chiefly the cause of the current increase, since there has been a number of substantial foreign orders placed in the market during the past week. On the other hand, however, these orders have been pending for several weeks. France, Japan and Holland have been most prominent in the current ordering, although some demand from Russia and England is reported. These orders are all for multiple units and cover the whole range of machinery except drills and brakes and shapers. Of course, smaller machines such as millers, grinders and lathes are most numerous, but planers and boring mills are also included on the list.

Delivery is still a matter of deep concern to local plants and in some instances quotations are being made for delivery in the latter part of next summer and in one or two instances, as late as early next fall. Some of the busier plants are finding space in other factories and have contracted a substantial portion of their work out. Production in this area can practically be said to be now at capacity, although if there were available additional skilled labor, plants would have further increase in operations.

French Getting Ready To Buy Machine Tools

CLEVELAND — Production and deliveries are the principal problems at all machine tool plants in this area. Despite the fact that certain facilities are overtaxed, pressure is being applied by some buyers for quicker shipments. Russia and Japan are reported to be particularly aggressive. Meanwhile, inquiries continue strong. The French commission seeking machine tools and other equipment for airplane plants has collected considerable data and is expected to act soon. At the same time, American automotive and airplane parts manufacturers with French plants are circulating large lists. Several shell orders have been placed by the French. Revision of the neutrality law will require revised practice by some machine tool producers selling abroad, especially in regard to the passing of title.

On the domestic side, machine tool requirements of steel companies not only in this vicinity but over the nation have been heavy. Pennsylvania Railroad has

been outstanding among the carriers. New business is still good around Cleveland, but Detroit is reported much quieter. Recent sales here are headlined by a \$50,000 planer; 32 small grinders for an airplane parts firm; radial, milling machine and shapers for a steel mill equipment company; lathes for a steam shovel manufacturer; and eight screw machines for a Toledo company. Most of the Government educational war orders are small here and will not require extensive machine tool purchases.

Press manufacturers report automotive business has tapered, partly due to the labor trouble experienced by one auto producer.

Rebuilt Machinery Sellers Benefit From Long Deliveries

CHICAGO—Orders for machine tools continue to come in at the rate which made October the best month of the year for most sellers here. To date no diminution in the volume of inquiries has been noticed, in spite of almost universally long deliveries. Sellers of used and rebuilt machinery, being able to ship from stock in most cases, are reaping a harvest because of the delivery situation in new machines. Some foreign buying of rebuilt machine tools is reported. Requests for bids are seen regularly from the Rock Island arsenal, the latest calling for a hydraulic cut-off saw, five universal millers, a plain miller, a bench drill grinder, two tool grinders, and four drill grinders. Figures must be in by Nov. 20 on the grinders, Nov. 21 on the millers, and Nov. 26 on the cut-off saw.

Machinery Being Lined Up For Foreign Aircraft Engine

DETROIT—Varied activity locally has a strong international flavor as a buying program is outlined for machine tools to manufacture a large foreign aircraft engine. This is the second major program of this sort to be launched in two weeks and it looks as though the limiting factor in machine tool sales activities will very definitely be the ability of dealers to arrange deliveries from machine tool manufacturers.

An educational order for manufacture of 50,000 howitzer shells is being run through one Detroit plant, according to information available. Because the order is small, no new equipment will be purchased. However, the firm has made inquiries regarding the complete manufacturing set-up. Another inquiry for gaging equipment for shells has been made.

It is reported that a new building for the manufacture of Johansson gage blocks will be erected by Ford Motor Co., with an expansion of activity indicated. All fine operations are now performed in the Ford laboratory. Precision gage blocks are understood now to be quotable at two to three weeks delivery, compared with conditions just a short time ago when deliveries were being made within three days after order.

Huge Order Volume Still Maintained in the East

NEW YORK—There appears to be no decline in the volume of orders. Leading sellers are booking business at about six times the normal rate. With leading machine tool builders booked far ahead, considerable business is being lost because of extended deliveries, but this situation is letting second-line builders come in on business they missed in the first onslaught of buying. Sellers of such equipment indicate, however, that competition is still very keen and that some remarkable revisions of delivery promises have been made to meet a competitive situation.

Military business is still in the limelight, with the possible exception of automatic screw machines, which are going to general sources rather than to aircraft parts makers and the Army and Navy. New York is host to many foreign military missions here to buy machine tools. The French are the most active buyers, particularly the Air Ministry, which is in the market not only for completed aircraft but also for machine tools to make plane structures and engines, also machine gun equipment for planes. Representatives of the Japanese Army, Navy and Air Force are also lining up machinery for manufacturing armaments, while a Brazilian mission is here to buy shell-making machinery. Most British buying has been through agents in England, but the setting of a central buying agency through Canada may change this set-up.

Eastern Arsenals Continue To Issue Lists

BOSTON—While Government agencies in New England are not purchasing machine tools as freely as they did earlier in the year, they are constantly in the market for equipment. At the moment the Watertown, Mass., Arsenal is in the market for one sliding bed gap lathe; a multi-tool turning lathe; and six horizontal boring mills with six sets of fixtures. The Springfield, Mass., Armory is in the market for five universal grinding machines; two horizontal hammers; six automatic screw machines; one surface grinding machine; one broaching machine, and one high duty hack saw.

Mechanical Handling Systems, Inc., Detroit, manufacturer of conveyors and allied materials handling equipment, has appointed Wonham, Inc., 44 Whitehall Street, New York, to cover Connecticut, northern New Jersey and the southern portion of New York state, and Kearney Engineering Co., 2402 Market Street, Philadelphia, to cover southern New Jersey, Wilmington, Del., and vicinity and eastern Pennsylvania.

PRODUCTS INDEX

BILLETS—Forging
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky.
Harrisburg (Pa.) Steel Corp.
Republic Steel Corp., Cleveland, Ohio.

BILLETS—Re-rolling
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., The, Newport, Ky.

BILLETS—Steel
Bethlehem (Pa.) Steel Company.
Continental Steel Corp., Kokomo, Ind.
Harrisburg (Pa.) Steel Corp.
Jones & Laughlin Steel Corp., Pittsburgh.
Tennessee Coal, Iron & Railroad Co.
(U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BLANKS—Chisel
Cleveland (Ohio) Punch & Shear Works Co., The.
Cleveland Steel Tool Co., The, 660 E. 82nd St., Cleveland, Ohio.

BLANKS—Gear and Pinion
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

BLANKS—Gear, Silent Steel
Walton, John, Corp., New Brunswick, N. J.

BLAST CLEANING EQUIPMENT
American Foundry Equipment Co., The, 510 S. Byrkit St., Milwaukee, Ind.
Pangborn Corporation, Hagerstown, Md.

BLAST FURNACES
Brassett, H. A. & Co., Chicago, Ill.

BLAST GATES
Rockwell, W. S. Co., 50 Church St., N.Y.C.

BLOCKS—Chain
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

BLOWERS
American Blower Corp., 6000 Russell St., Detroit.
Buffalo (N. Y.) Forge Co., 492 Broadway.

BLOWPIPES—Oxy-Acetylene Welding & Cutting
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

BLOWPIPES—Soldering, Heating, Annealing
American Gas Furnace Co., Elizabeth, N. J.

BOILERS—Waste Heat
Babcock & Wilcox Co., The, 35 Liberty St., N. Y. C.

BOILERS—Water Tube
Babcock & Wilcox Co., The, 35 Liberty St., N. Y. C.

BOLT CUTTERS
Lanthe Mch. Co., Inc., Waynesboro, Pa.
National Machinery Co., Tiffin, Ohio.

BOLT AND NUT MACHINERY
Ajax Mfg. Co., The, Cleveland, Ohio.
Lanthe Machine Co., Inc., Waynesboro, Pa.
National Machinery Co., Tiffin, Ohio.
Waterbury (Conn.) Farrel Fdry. & Mch. Co., The.

BOLT & RIVET CLIPPERS
Helwig Mfg. Co., St. Paul, Minn.

BOLTS—Carriage and Machine
Cleveland (Ohio) Cap Screw Co., The.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.
Triplex Screw Co., Cleveland.

BOLTS—Special
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOLTS—Steel
Progressive Mfg. Co., Torrington, Conn.

BOLTS—Steel, Recessed Head
American Screw Co., Providence, R. I.

BOLTS—Track
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

BOLTS AND NUTS
American Screw Co., Providence, R. I.
Clark Bros. Bolt Co., Milledale, Conn.
Republic Steel Corp., Cleveland, Ohio.
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.
Triplex Screw Co., Cleveland.

BOND—Grinding Wheel
Bakelite Corp., 247 Park Ave., New York City.

BORING BARS
Bullard Co., The, Bridgeport, Conn.
Carboloy Co., Inc., 11153 East 8-Mile Road, Detroit, Michigan.
Gisholt Machine Co., Madison, Wisconsin.

BORING, DRILLING & MILLING MACHINES—Horizontal
Giddings & Lewis Machine Tool Co., Fond Du Lac, Wis.
Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.
Lucas Machine Tool Co., Cleveland.
National Automatic Tool Co., Richmond, Ind.

BORING & DRILLING MACHINES—Vertical
Baker Bros., Inc., Toledo, Ohio.
Bullard Co., The, Bridgeport, Conn.

BORING MACHINES—Diamond & Carbide Tools
Heald Machine Co., Worcester, Mass.

BORING MACHINES—Jig
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

BORING MACHINES—Precision
Cimatool Co., The, Dayton, Ohio.

BORING & TURNING MILLS—Vertical
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Planer Co.

BRAKE LINING & BLOCKS—Asbestos
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan Inc., The, 2 Townsend St., Passaic, N. J.

BRAKES—Electric
Clark Controller Co., The, Cleveland.
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.
Kiekhafer Corp., Cedarburg, Wis.

BRAKES—Electric & Mechanical
Clark Controller Co., The, Cleveland.
Electric Controller & Mfg. Co., The, Cleveland.

BRAKES—Magnetic
Kiekhafer Corp., Cedarburg, Wis.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

BRAKES—Metal Forming
Brant Machinery & Engineering Co., Chicago.
Cincinnati (Ohio) Shaper Co., The.
Cleveland Crane & Engineering Co., The.
Steelweld Machinery Div., Wickliffe, Ohio.

Dreis & Krump Mfg. Co., Chicago.
Ferracute Machine Co., Bridgeport, N. J.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

BRICK—Fire Clay
Carborundum Co., The, Niagara Falls, N. Y.
Illinois Clay Products Co., Joliet, Ill.

BRICK—Insulating
Babcock & Wilcox Co., The, 35 Liberty St., N. Y. C.

BRIDGE BUILDERS
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Belmont Iron Works, Philadelphia.

BRIDGE OPERATING MACHINERY—Movable
Earle Gear & Mch. Co., Philadelphia.

BRICKS—Insulating
Babcock & Wilcox Co., The, 35 Liberty St., N. Y. C.

BROACHES
American Broach & Machine Co., Ann Arbor, Mich.
Colonial Broach Co., Detroit.

BROACHING MACHINES
American Broach & Machine Co., Ann Arbor, Mich.
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Milling Mch. Co., The.
Colonial Broach Co., Detroit.
Lucas Machine Tool Co., Cleveland.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

BRONZE FOR DIES
Ameco Metal, Inc., Milwaukee, Wis.

BRONZE—Phosphor
Bunting Brass & Bronze Co., Toledo, Ohio.

BRUSHES—Machine
Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.

BRUSHES—Wire
Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.

RUCKETS—Clamshell
Blaw-Knox Div. of Blaw-Knox Co., Pittsburgh, Pa.
Cullen-Friedstedt Co., 1303 S. Kilbourn Ave., Chicago.
Hayward Co., The, 50 Church St., N. Y. C.
Heyl & Patterson, Inc., Pittsburgh.
Industrial Brownhoist Corp., Bay City, Mich.
Wellman Engineering Co., The, Cleveland.

RUCKETS—Electric Motor
Hayward Co., The, 50 Church St., N. Y. C.

RUCKETS—Orange Peel
Hayward Co., The, 50 Church St., N. Y. C.

BUFFERS & POLISHING MACHINES
Packer Machine Co., The, Meriden, Conn.

PUFFING APPLICATORS—Automatic
Packer Machine Co., The, Meriden, Conn.

BUFFING COMPOUND—Stainless & Other Steels
Harrison & Co., Haverhill, Mass.

BUILDINGS—Steel
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
American Rolling Mill Co., Middletown, Ohio.

Belmont Iron Works, Philadelphia.
Blaw-Knox Div. of Blaw-Knox Co., Pittsburgh, Pa.

Iron & Steel Products, Inc., Chicago.

BULLDOZERS
Ajax Mfg. Co., The, Cleveland, Ohio.
Cleveland Crane & Engineering Co., The.
Steelweld Machinery Div., Wickliffe, Ohio.

JUST BETWEEN US TWO

And Lol

You can take a shortcut to fame by inventing a new and fancy way of measuring the specific gravity of reader interest in this and other industrial journals. Industrial advertisers cry for a new gage.

We tell them that your love for your favorite family journal is bottomless, and when they ask for proof we point to our generous and growing circulation, to our editors' brilliance, to our stratospheric subscription renewal percentage, and to the other time-honored hydrometers.

But all they do is to murmur, "Very nice," and their souls are not stirred. At this point we used to say, "Find out for yourself which publication is best. Send questionnaires to your customers."

Sometimes they would, and when they did they usually found your f.f.j. in top position. But mail questionnaires are no longer in Caesar's wife's class.

Some say that people fill them out offhand and mark X's in the "I read" column alongside of publications they don't even get, and that the man who may read, say, *Click* avidly may give a vote to *Atlantic Monthly* to make it look good.

If this is so, we are sorry, for the industry's No. 1 manufacturer just made a survey, and of 63 magazines listed, you can guess who had the Abou Ben Adhem position.

Executive in Full Caps B.F.

In this survey one man reported that he reads the *New Yorker* in his office. We wonder if he is still with the same firm.

Tantalizing Typographers

To show their wares, typographers issue booklets with specimen lines set in the different faces of type they have. Usually the same sentence is set over and over again, but the Kline Linotyping Co., New York City, changes the text with each type face.

The sentences are not completed. Each is cut off in its prime at the end of the line. Samples: "Truly great people are bound to make fools of..." "Then get over it if you want to join..." "He can go too far, as he has discovered several times recently..." "The pet lasted two whole days, but finally died from..."

Every time we try to use the book we forget the job in hand as we get to wondering whom truly great people make fools of, what you have to get over to join what, who has gone too far, and what the pet finally died of.

Tsetse Flybite Cure

Something else that keeps us awake nights is wondering what line of business the Screen Test Foto Fit Co., Cleveland, which just wrote us a letter, is in.

Low Carbon Phrases

The gentlest piece of writing we have seen in a long time is this, in a British contemporary:

We regret that in present conditions it has been necessary to suspend the series of articles on all-metal aircraft. It is hoped that the position will become easier in the near future and that they can then be resumed.

Blurb

For both sides in a hearing of any kind to quote the same authority is decidedly unusual. One side swears by Authority "A", and the other by Authority "B", who wouldn't touch "A's" findings with a 10-ft. pole.

But at the TNEC hearings it's different. Both the Department of Justice and the United States Steel Corp. are using the same authority.

L. W. ("This Week in Washington," see page 66) Moffett says it would do your heart good to see the charts, exhibits and references, taken from your favorite family journal, plastered all over the large hearing room.

Gunkological Addendum

"Gunk" isn't new. Royal E. Smith, Wilmington, Del., writes that "gunk and gurry" is an old New England phrase applied to fishing boats.

Puzzles

If you arrived at five cows as the answer to last week's grazing problem, you check with Sir Isaac Newton.

Charles S. ("Doc") Kinnison of Hoskins Mfg. Co. saw this in the Pathfinder:

An army division in Europe has more than 20,000 men, divided into 5 brigades. If 1/3 of the first, 2/7 of the second, 7/12 of the third, 9/13 of the fourth and 15/22 of the fifth brigade happen in each case to be the same number of men, how many men are there in each brigade?

—A.H.D.

PRODUCTS INDEX

BURNERS—Oil or Gas
American Gas Furnace Co., Elizabeth, N. J.

BURNISHING MACHINES—Gear
Cimatool Co., The, Dayton, Ohio.

BURRING MACHINES
Cimatool Co., The, Dayton, Ohio.

BUSHINGS—Bronze
Ampeco Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., Toledo, O.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.
Shenango-Penn Mold Co., Dover, Ohio.

BUSHINGS—Oilless
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.

BUSHINGS—Phosphor Bronze
Bunting Brass & Bronze Co., Toledo, Ohio.

BY-PRODUCTS COKE AND GAS PLANTS
Koppers Co., Engineering & Construction Div., Pittsburgh.

CABINETS—Tool & Parts
Standard Steel Products Co., Poughkeepsie, N. Y.

CABLE—Electric
General Electric Co., Schenectady, N. Y.
Lincoln Electric Co., The, Cleveland.

CABLEWAYS AND TRAMWAYS—See
Tramways

CALCIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CARBIC
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

CARBIDE
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

CARBIDE—Boron
Norton Co., Worcester, Mass.

CARBIDES—Cemented
Carboloy Co., Inc., 11153 East 8-Mile Road, Detroit, Michigan.

CARBURIZING—See Heat Treating

CARLOADERS
Clark Tractor Div., Clark Equipment Co., Battle Creek, Mich.

CARS—Railway
Iron & Steel Products, Inc., Chicago.

CARS—Industrial and Mining
Atlas Car & Mfg. Co., The, Cleveland.
Heyl & Patterson, Inc., Pittsburgh.

CASE HARDENING—See Heat Treating

CASTERS
Darnell Corp., Ltd., Long Beach, Calif.

CASTINGS—Acid or Heat Resisting
Ampeco Metal, Inc., Milwaukee, Wis.
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Aluminum
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

CASTINGS—Alloy Iron
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Alloy Steel
Advance Foundry Co., The, Dayton, Ohio.
Detroit (Mich.) Alloy Steel Co.
Hartford (Conn.) Electric Steel Corp.
Lebanon (Pa.) Steel Foundry.
Mackintosh-Hemphill Co., Pittsburgh.
Michiana Products Corp., Michigan City, Ind.

CASTINGS—Aluminum
Aluminum Co. of America, Pittsburgh.

CASTINGS—Brass, Bronze, Copper or Aluminum
Bunting Brass & Bronze Co., The, Toledo, Ohio.

CASTINGS—Bronze
Cadman, A. W., Mfg. Co., Pittsburgh.
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Copper
National Bearing Metals Corp., Pittsburgh.
Shenango-Penn Mold Co., Dover, Ohio.
Spencer's, I. S., Sons, Inc., Guilford, Ct.

CASTINGS—Corrosion Resisting
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Die
Titan Metal Mfg. Co., Bellefonte, Pa.

CASTINGS—Die, Aluminum
Aluminum Co. of America, Pittsburgh.

CASTINGS—Electric Steel
Continental Roll & Steel Foundry Co., East Chicago, Ind.

Crucible Steel Castings Co., Lansdowne, Pa.
Detroit (Mich.) Alloy Steel Co.
Lebanon (Pa.) Steel Foundry.
National-Erie Corp., Erie, Pa.
Ohio Steel Foundry Co., Lima, Ohio.

CASTINGS—Gray Iron
Advance Foundry Co., The, Dayton, Ohio.
American Engineering Co., Philadelphia.
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—High Test & Alloy Iron
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Magnesium Alloys
American Magnesium Corp., 1701 Gulf Bldg., Pittsburgh.

CASTINGS—Malleable
Canton (Ohio) Malleable Iron Co., The, Lake City Malleable Co., The, 5100 Lakeside Ave., Cleveland.

CASTINGS—Manganese, Steel and Alloy
Petitbone Mulliken Corp., Chicago.

CASTINGS—Monel & Nickel
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Semi-Steel
Cramp Brass & Iron Foundries Co., Philadelphia.

CASTINGS—Steel
American Rolling Mill Co., Middletown, Ohio.

CASTINGS—Steel Foundry & Machine
Bethlehem (Pa.) Steel Foundry.

CASTINGS—Steel Foundry & Machine
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

CASTINGS—Steel Foundry & Machine
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.

CASTINGS—Steel Foundry & Machine
Continental Roll & Steel Foundry Co., East Chicago, Ind.

CASTINGS—Steel Foundry & Machine
Crucible Steel Castings Co., Lansdowne, Pa.

CASTINGS—Steel Foundry & Machine
Hartford (Conn.) Electric Steel Corp.

CASTINGS—Steel Foundry & Machine
Mackintosh-Hemphill Co., Pittsburgh.

CASTINGS—Steel Foundry & Machine
Michiana Products Corp., Michigan City, Ind.

CASTINGS—Steel Foundry & Machine
National-Erie Corp., Erie, Pa.

CASTINGS—Steel Foundry & Machine
Ohio Steel Foundry Co., Lima, Ohio.

CASTINGS—Steel Foundry & Machine
Standard Steel Wks. Co., Phila., Pa.

CASTINGS—Steel Foundry & Machine
Steel Founders' Society of America, Cleveland.

CASTINGS—Steel Foundry & Machine
Strong Steel Foundry Co., Buffalo, N. Y.

CEMENT—Acid-Proof
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

CEMENT—Polishing Wheel
Harrison & Co., Haverhill, Mass.

CEMENT—Refractory
Carborundum Co., The, Perth Amboy, N. J.

CEMENT—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.

CENTERING MACHINES
Hendley Machine Co., Torrington, Conn.

CHAINS—Conveyor & Elevator
Baldwin-Duckworth Div. of Chain Belt Co., Springfield, Mass.

CHAINS—Power Transmission
Baldwin-Duckworth Div. of Chain Belt Co., Springfield, Mass.

CHAINS—Roller
Baldwin-Duckworth Div. of Chain Belt Co., Springfield, Mass.

CHAINS—Silent
Link-Belt Co., 519 North Holmes Ave., Indianapolis, Ind.

CHAINS—Steel
Link-Belt Co., 519 North Holmes Ave., Indianapolis, Ind.

CHAINS—Steel
Whitney Chain & Mfg. Co., Hartford, Ct.

CHAMFERING MACHINES (Gear)
Cimatool Co., The, Dayton, Ohio.

CHANNELS—See Angles, Beams, Channels and Tees

CHECKS—Metal
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

CHEMICALS—Industrial
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CHEMICALS—Rust Proofing
Alroce Chemical Co., Cranston, Providence, R. I.

CHROMIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CHROMIUM — Plating — See Plating — Chromium

CHRONOGRAPHS
Stillman, M. J., Co., Inc., Chicago.

CHUCKING MACHINES—Automatic
New Britain-Gridley Machine Div., The, New Britain Machine Co., New Britain, Conn.

CHUCKING MACHINES—Multiple Spindle
Baird Mch. Co., The, Bridgeport, Conn.

CHUCKS—Drill
Cleveland (Ohio) Twist Drill Co., The, Morse Twist Drill & Mach. Co., New Bedford, Mass.

CHUCKS—Magnetic
Brown & Sharpe Mfg. Co., Providence, R. I.

CHUCKS—Twist Drill
Cleveland (Ohio) Twist Drill Co., The, Morse Twist Drill & Mach. Co., New Bedford, Mass.

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COMPOUNDS—Drawing
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.

COMPRESSORS—Air
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.

COMPRESSORS—Gas
Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Rebuilt. (See Clearing House Section)

CONDENSERS—Surface & Jet
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

CONDUITS—Flexible Metallic
Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

CONTACTS—Electrical
Mallory, P. R., & Co., Inc., Indianapolis, Ind.

CONTRACTORS' SUPPLIES — Second-Hand. (See Clearing House Section)

CONTROL SYSTEMS—Temperature
Leeds & Northrup Co., 4956 Stenton Ave., Philadelphia.

CONTROLLERS—Cane
Clark Controller Co., The, Cleveland.

CONTROLLERS—Electric
Clark Controller Co., The, Cleveland.

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Clark Controller Co., The, Cleveland.

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